Appendix 12

Comparison of the Effectiveness of Stipulations and Required Operating Procedures

Appendix 12 A. Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C

<table>
<tr><th colspan="2">Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C</th></tr>
<tr><td>Stipulation A-2 for Alternatives A and B. Except during overland moves and seismic operations, fuel, other petroleum products, and other liquid chemicals designated by the AO, whether in excess of 660 gallons in a single tank or in excess of 1,320 gallons in multiple containers, shall be stored within an impermeable lined and diked area capable of containing 110 percent of the stored volume. The liner material shall be compatible with the stored product and capable of remaining impermeable during typical weather extremes expected throughout the storage period. Permanent fueling stations shall be lined or have impermeable protection to prevent fuel migration to the environment due to overfills and spills. The storage area shall be located at least 100 ft from the active flood plain of any non-fish bearing waterbody and 500 ft from the active floodplain of any fish-bearing waterbody with the exception of small caches (up to 210 gallons) for motor boats, float planes, ski planes and small equipment.</td><td>Stipulation A-2 for Alternative C. Except during overland moves and seismic operations, fuel, other petroleum products, and other liquid chemicals designated by the AO, whether in excess of 660 gallons in a single tank or in excess of 1,320 gallons in multiple containers, shall be stored within an impermeable lined and diked area capable of containing 110 percent of the stored volume. The liner material shall be compatible with the stored product and capable of remaining impermeable during typical weather extremes expected throughout the storage period. Permanent fueling stations shall be lined or have impermeable protection to prevent fuel migration to the environment from overfills and spills. The storage area shall be located at least 500 ft from the active flood plain of any waterbody with the exception of small caches (up to 210 gallons) for motorboats, float planes, and ski planes.</td></tr>
<tr><td colspan="2">The protective measure of Stipulation A-2 does not provide any protective benefit for: Soils, Estuarine Water Quality, some Birds, Marine Mammals, Bowhead Whales, Sociocultural Systems, Air Quality, or the Regional Economy.

Stipulation A-2 for Alternatives A and B provides essentially the same benefits as provided by Stipulation A-2 for Alternative C for: Paleontological Resources, Freshwater Quality, Vegetation, Non-Marine and Marine Fish, Cultural Resources, Recreation, Visual Resources, and Coastal Zone Resources by providing protection to resources through spill containment.

Stipulation A-2 for Alternative C provides additional environmental protection above that of Stipulation A-2 for Alternatives A and B for: Water Resources, Terrestrial Mammals, some Birds, Threatened and Endangered Eiders, and Subsistence-Harvest Patterns. Stipulation A-2 for Alternative C requires containment of fuel, petroleum products, and liquid chemicals, which reduces the likelihood of spills entering a lake or river. It reduces the potential of harming or killing forage fish, which would benefit the breeding success of fish-eating birds such as loons, mergansers, and terns, and threatened and endangered eiders. The protection to subsistence resources is beneficial to the subsistence hunting and gathering.</td></tr>
</table>

<table>
<tr><th colspan="2">Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C (continued)</th></tr>
<tr><td>Stipulation A-3 for Alternatives A and B. Refueling of equipment within 500 ft of the active flood plain of any fish-bearing waterbody and 100 ft from non-fish-bearing waterbodies is prohibited. BLM acknowledges that exceptions are commonly warranted for refueling motor boats, float planes, ski planes, small generators, water pumps and other light equipment used in conjunction with temporary activities.</td><td>Stipulation A-3 for Alternative C. Refueling of equipment within 500 ft of the active flood plain of any waterbody is prohibited with the exception of refueling motor boats, float planes, ski planes, small generators, water pumps and other light equipment used in conjunction with temporary activities.</td></tr>
<tr><td colspan="2">The protection offered by Stipulation A-3 does not provide any protective benefit for: Soils, Estuarine Water Quality, most Birds, Marine Mammals, Bowhead Whales, Sociocultural Systems, Air Quality, or the Regional Economy.

The benefits provided by Stipulation A-3 for Alternatives A and B are essentially the same as the benefit provided by Stipulation A-3 for Alternative C for: Paleontological Resources, Freshwater Quality, Vegetation, Non-Marine and Marine Fish, Cultural Resources, Recreation, Visual Resources, and Coastal Zone Resources by requiring a 500-ft setback, which affords protection by reducing the likelihood a spill will enter a stream or other waterbody.

Stipulation A-3 for Alternative C provides additional environmental protection above that of Stipulation A-2 for Alternatives A and B for: Water Resources, Terrestrial Mammals, some Birds, Threatened and Endangered Eiders, and Subsistence-Harvest Patterns. Stipulation A-2 for Alternative C requires a 500-ft setback for all but incidental fuel and chemical storage, which reduces the likelihood of spills entering a lake or river. It reduces the potential of harming or killing forage fish, which would benefit the breeding success of fish-eating birds such as loons, mergansers, and terns, and threatened and endangered eiders. The protection to subsistence resources is beneficial to the subsistence hunting and gathering activities.</td></tr>
</table>

Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C (continued)	
Stipulation B-1 Alternatives A and B. Water withdrawal is not allowed during winter from lakes less than 7 ft (2.1 m) deep unless the waterbody lacks a connection with, and is not subject to, seasonal flooding by a fish-bearing stream. The AO may authorize water withdrawals from any lakes, creeks, or rivers if the proponent demonstrates that the location and volume of water withdrawal does not endanger resident fish populations.	**Stipulation B-1 for Alternative C.** Water withdrawal from rivers and streams during winter is prohibited. Water withdrawal is limited to 15% of the under-ice water volume in any fish-bearing lake. After consultation with the appropriate Federal, State, and NSB regulatory and resource agencies, the AO may authorize withdrawals from any lake if the proponent demonstrates that no fish exist in the lake. A water-monitoring plan will be required to assess drawdown and water quality changes before, during, and after pumping any fish-bearing lakes.
The protective measure offered by Stipulation B-1 does not provide any protective benefit for: **Soils, Vegetation, Marine Fish, Birds, Marine Mammals, Bowhead Whales, Threatened and Endangered Eiders, Recreation, Visual Resources, Environmental Justice, Air Quality,** or the **Regional Economy.** Both stipulations provide some non-specific benefits to **Coastal Zone Resources.** The benefits provided by Stipulation B-1 for Alternatives A and B are essentially the same as the benefit provided by Stipulation B-1 for Alternative C for: **Paleontological Resources, Cultural Resources, Water Resources, Freshwater Quality**, **Terrestrial Mammals**, and **Coastal Zone Resources** by limiting the amount of water that can be withdrawn from lakes during the winter. The requirement to only remove 15% of the under-ice water volume, as required in fish-bearing lakes by ADF&G and ADNR, is lacking in both stipulations. Stipulation B-1 for Alternative C provides additional environmental protection above that of Stipulation B-1 for Alternatives A and B for: **Non-Marine Fish**, **Subsistence-Harvest Patterns,** and **Sociocultural Systems.** It provides a higher level of protection to the fish and habitat that overwinter in the lakes, which enhances the protection to subsistence activities. Consultation with local regulators (North Slope Borough) is a benefit.	

Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C (continued)	
No corresponding stipulation for **Alternatives A and B.**	**Stipulation B-2 for Alternative C.** Compaction of snow cover or snow removal from fish-bearing waterbodies shall be prohibited except at approved ice-road crossings and water pumping stations on lakes.
The protective measure offered by Stipulation B-2 for Alternative C does not provide any protective benefit for: **Air Quality,** the **Regional Economy, Soils, Estuarine Water Quality, Freshwater Quality, Vegetation, Marine Fish**, most **Birds**, **Marine Mammals**, **Terrestrial Mammals**, **Bowhead Whales**, **Threatened and Endangered Eiders**, **Recreation, Visual Resources**, **Sociocultural Systems,** and **Environmental Justice**. Both stipulations provide some non-specific benefits for **Coastal Zone Resources**. Stipulation B-2 for Alternative C provides some environmental protection for: **Paleontological Resources**, **Water Resources**, **Non-Marine Fish**, some **Birds** (Loons, Mergansers, and Terns), **Cultural Resources**, and **Subsistence-Harvest Patterns**. This stipulation limits snow compaction or removal for all but incidental travel, so the likelihood of increasing freezedown during winter or erosion during summer at a lake or river is greatly reduced. This is in agreement with ADF&G and ADNR. Fish over-wintering areas are better protected with snow in place. Removal of snow allows deeper freezedown of ice and potentially stresses or kills fish. This stipulation could affect the breeding success of fish-eating birds such as loons, mergansers, and terns. The protection of fish resources provides enhanced protection to subsistence-harvest patterns.	

Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C (continued)

ROP C-1 for Alternatives A and B. The following restrictions apply to overland moves, seismic work, and any similar use of heavy equipment (other than actual excavations as part of construction) on non-roaded surfaces during the winter season: a. Motorized ground-vehicle use will be minimized within one mile of any raptor nest from April 15 through August 15, with the exception that use will be minimized in the vicinity of gyrfalcon nests beginning March 15. Such use may be prohibited within ½ mile of active raptor nests. b. Refueling of equipment, when practical, should occur at least 500 ft from fish-bearing waterbodies and 100 ft from other waterbodies.	**Stipulation C-2 for Alternative C.** The following restrictions apply to overland moves, seismic work, and any similar use of heavy equipment (other than actual excavations as part of construction) on non-roaded surfaces during the winter season: a. Motorized ground-vehicle use will be minimized within one mile of any raptor nest from April 15 through August 15, with the exception that use will be minimized in the vicinity of gyrfalcon nests beginning March 15. Such use will be prohibited within 1/2 mile of known raptor-nesting sites. b. Refueling of equipment is prohibited within the active floodplain of any waterbody.

The protective measure offered by ROP C-1 for Alternatives A and B and Stipulation C-2 for Alternative C do not provide any protective benefit for: **Soils, Estuarine Water Quality**, **Vegetation**, **Non-Marine Fish**, **Marine Fish**, **Marine Mammals**, **Bowhead Whales**, **Recreation, Visual Resources**, **Sociocultural Systems**, **Environmental Justice**, **Air Quality,** or the **Regional Economy**.

Both the ROP and stipulation provide some non-specific benefits for: **Coastal Zone Resources**.

The benefits provided by ROP C-1 for Alternatives A and B are essentially the same as the benefit provided by Stipulation C-2 for Alternative C for: **Paleontological Resources**, **Freshwater Quality**, **Terrestrial Mammals, Cultural Resources**, and **Subsistence-Harvest Patterns.**

Stipulation C-2 for Alternative C provides additional environmental protection above that of ROP C-1 for Alternatives A and B for: **Water Resources, Non-Marine Fish**, **Birds**, and **Threatened and Endangered Eiders**. This measure does not allow refueling within the floodplain of rivers and lakes; therefore the likelihood of spills entering a lake or river is reduced for non-fish-bearing waterbodies. This is consistent with agreement between BLM and the ADF&G and ADEC.

Note: ROP C-1g. needs to be reconciled with Stipulation A-3. ROP C-1 could be more restrictive than Stipulation C-2b for fish-bearing waterbodies. The potential for disturbance of raptors, and other birds and threatened eiders occurring within the same area, and hydrocarbon- (etc.-) contamination of waterbirds and threatened eiders over a relatively small proportion of available habitat may be decreased.

Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C (continued)	
Stipulation D-1 for Alternatives **A and B.** Exploratory drilling in shallow lakes, streams, lake beds and the active floodplain will only be approved if the applicant can demonstrate to the satisfaction of the AO that impacts to fish, wildlife, vegetation, and the hydrologic condition are minimal.	**Stipulation D-1 for Alternative C.** Exploratory drilling in river, stream, and lakebeds, as determined by the active floodplain, is prohibited. In addition, exploratory drilling is not allowed within ¼ mile of any fish-bearing deep lake as determined to be in lake zone III, i.e., depth greater than 4 m (Mellor 1985) as shown in Map 20. If the fish-bearing status of the waterbody is unknown, the burden is on the lessee to demonstrate whether fish are absent.
The protective measure offered by Stipulation D-1 does not provide any protective benefit for: **Soils, Estuarine Water Quality, Marine Fish, Birds, Marine Mammals, Bowhead Whales, Threatened and Endangered Eiders, Recreation, Visual Resources, Sociocultural Systems, Environmental Justice, Air Quality,** or the **Regional Economy.** Both stipulations provide some non-specific benefits for: **Coastal Zone Resources**. The benefits provided by Stipulation D-1 for Alternatives A and B are essentially the same as the benefit provided by Stipulation D-1 for Alternative C for: **Freshwater Quality** and **Paleontological Resources** by reducing the impacts to the resources and lowering the likelihood of an oil spill reaching shallow lakes, streams, and other waterbodies. Stipulation D-1 for Alternative C provides additional environmental protection above that of Stipulation D-1 for Alternatives A and B for: **Freshwater Quality**, **Vegetation**, **Non-Marine Fish**, **Terrestrial Mammals, Marine Mammals, Cultural Resources**, and **Subsistence-Harvest Patterns**. The version of the protective measure in Alternative C provides a higher level of protection for water resources than the protective measure in Alternatives A and B because the Alternative C version requires a setback for exploratory drilling and, therefore, the likelihood of oil spills, drill cuttings, or chemicals entering a lake or river is reduced. This is in agreement with ADF&G and ADEC. There is a higher probability that cultural resources (archaeological sites) will be located near fish-bearing lakes than non-fish bearing lakes. Therefore, prohibiting drilling with ¼ mile of any fish-bearing lakes would serve to protect the cultural resource from impacts from drilling operations. The extended buffer provides a greater degree of protection to fish in the event of a fuel spill or in the event that drilling waste is not reinjected immediately. This measure could potentially prevent spills in or near a river or stream from reaching the marine environment where marine mammals may be exposed to the spill. The additional protection afforded several of the subsistence resources provides a higher the level of protection for subsistence-harvest patterns.	

Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C (continued)	
No corresponding stipulation for **Alternatives A and B.**	**Stipulation D-2 for Alternative C.** Permanent facilities such as airstrips and roads shall not be constructed during the exploration phase of oil and gas development.
Stipulation D-2 for Alternative C does not provide any protective benefit for: **Soils**, **Estuarine Water Quality, Freshwater Quality, Bowhead Whales**, **Recreation**, **Sociocultural Systems, Environmental Justice, Air Quality**, and **Regional Economy**. Stipulation D-2 for Alternative C provides environmental protection for: **Paleontological Resources**, **Water Resources**, **Birds**, **Terrestrial Mammals**, **Threatened and Endangered Eiders**, **Cultural Resources**, **Visual Resources, Subsistence-Harvest Patterns,** and **Coastal Zone Resources**. The removal of any permanent facilities, such as airstrips or roads constructed for exploratory drilling, is unlikely given the difficulties and cost of removal, should exploration activities not lead to development. Construction of airstrips and roads during the exploration phase would result in having permanent facilities in areas that may never be developed. If not reclaimed, these roads and airstrips would increase recreational access to the area. In turn, this would result in increased harvest of terrestrial mammals and increased disturbance impacts. Cumulative long-term impacts could be significant. The prohibition against constructing permanent facilities during the exploration phase removes the remote changes of disturbing deeply buried paleontological resources and cultural resources, at least during the exploration phase. Structures alter the natural properties of the landscape. Not allowing structures during exploration will ensure that view sheds remain essentially natural, thereby protecting visual resources. This measure would reduce the potential for burial of a relatively small proportion of breeding and foraging habitats used by birds and eiders. Disturbance of birds and eiders would be avoided during the exploration phase of oil and gas development if the roads and airstrips were used during the summer breeding season. The protection afforded to subsistence resources would provide fewer disturbances to subsistence practices.	

Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C (continued)		
No corresponding stipulation for **Alternative A.**	**Stipulation E-1 for Alternative B.** The following subsistence, wildlife habitat, cultural/paleontological and traditional/cultural land use areas (see Map 84) are of significant concern to resource managers and local communities. (Resources of concern are listed in parentheses.) Should significant resources occur within these land use areas based on site specific investigation, additional design features or mitigation developed through site/project specific NEPA analysis will be required to minimize impacts. Setbacks include the bed of waterbodies and are measured from the active floodplain. a. Ikpikpuk River: extending from the mouth south through the raptor nesting area extending from section 13, T7N., R12W. UM, to T2N., R 12W., UM where up to a 1 mile setback may be required (fish, raptors, subsistence, cultural, and paleontological resources). . . . etc. (See Table II-02 for details)	**Stipulation E1 for Alternative C.** Permanent oil and gas facilities, including roads, airstrips, and pipelines, are prohibited within and adjacent to the waterbodies and within the prescribed distances from other resources listed below (see Map 84) at the distances identified to protect fish and raptor habitat, cultural and paleontological resources, and subsistence and other resource values. (Resources of concern are listed in parentheses.) Setbacks include the bed of the waterbody and are measured from the active floodplain. On a case-by-case basis, and in consultation with appropriate Federal, State and NSB regulatory and resource agencies, essential pipeline and road crossings will be permitted through setback areas in those instances where no other suitable sites are available. Stream crossings will be sited perpendicular to the main channel flow; lake crossings will be at the narrowest point. Road crossings will be prohibited in the setback area adjacent to the Colville River a. Ikpikpuk River: a ½-mile setback from the bank of the Ikpikpuk River extending from the mouth south to the Raptor nesting area extending from section 13, T7N., R12W. UM, to T2N., R 12W., UM where a 1 mile setback is required (fish, raptors, subsistence, cultural, and paleontological resources). . . .etc. (See Table II-02 for details)

Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C (continued)

The protective measure offered by Stipulation E-1 for Alternatives B and C do not provide any protective benefit for: **Soils**, **Estuarine Water Quality**, **Marine Fish**, **Marine Mammals, Bowhead Whales, Recreation, Visual Resources**, **Air Quality,** and **Regional Economy**.

Both stipulations provide some non-specific benefits for: **Coastal Zone Resources**.

The benefits provided by Stipulation E-1 for Alternative B are essentially the same as the benefit provided by Stipulation D-1 for Alternative C for: **Birds** and **Threatened and Endangered Eiders**. The potential for disturbance (raptors, other birds, and threatened eiders within the same area), habitat burial (other birds, threatened eiders), hydrocarbon contamination (waterbirds, threatened eiders), and forage fish kill (fish-eating waterbirds such as loons, mergansers, and terns) over a relatively small proportion of available habitat would be decreased.

Stipulation E-1 for Alternative C provides additional environmental protection above that of Stipulation D-1 for Alternative B for: **Paleontological Resources**, **Water Resources**, **Freshwater Quality**, **Vegetation**, **Non-Marine Fish**, **Terrestrial Mammals**, **Cultural Resources**, **Subsistence-Harvest Patterns, Sociocultural Systems,** and **Environmental Justice.** The setbacks required for permanent facilities from the floodplain of rivers and lakes, the likelihood of spills, thermokarst sediment erosion, or water diversions or impoundments impacting a lake or river are reduced. This is consistent with the agreement between BLM, ADF&G and ADNR. This measure protects channel integrity, bank stability, and riparian vegetation and reduces the likelihood that an oil spill would reach the protected waters. The areas in the setbacks are adjacent to rivers or lakes. This stipulation may confer more protection in riparian habitats that are important use areas for grizzly bears, wolverines and moose. The additional protection would be minor. Paleontological resources and cultural resources are more likely to occur along the banks of waterbodies, especially lakes and rivers. The stipulation of a specified setback from such waterbodies would help to protect these resources. The stipulation also provides greater protection of subsistence resources and traditional hunting and fishing camps; therefore, there would be less disturbance to subsistence activities

Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C (continued)	
No corresponding stipulation for **Alternatives A and B.**	**Stipulation E-2 for Alternative C.** Permanent roads (i.e. gravel, sand) connecting to a road system or docks outside the Planning Area are prohibited. Permanent roads necessary to connect pads within independent, remote oil fields are allowed but they must be designed and constructed to create minimal environmental impacts. Roads connecting production sites between separate oil fields may be considered.
The protective measure offered by Stipulation E-2 does not provide any protective benefit for: **Soils, Paleontological Resources**, **Estuarine Water Quality, Marine Fish**, **Marine Mammals**, **Bowhead Whales**, **Cultural Resources**, **Recreation**, **Sociocultural Systems, Environmental Justice, Air Quality,** or the **Regional Economy.** Stipulation E-2 for Alternative C provides environmental protection for: **Water Resources, Freshwater Quality, Vegetation, Non-Marine Fish, Birds, Terrestrial Mammals, Marine Mammals, Threatened and Endangered Eiders, Visual Resources, Subsistence-Harvest Patterns,** and **Coastal Zone Management.** The stipulation prohibits road systems from connecting outside the Planning Area. Thus, the likelihood of a long road that crosses numerous floodplains, rivers and lakes, causing thermokarst sediment erosion, water diversions, or impoundments, is reduced. The prohibition of permanent roads connecting to a road system or docks outside the Planning Area would be beneficial to caribou as they are sensitive to roads and traffic. Having a permanent road crossing caribou habitat would disrupt caribou movements yearlong and if situated in TLH insect-relief habitat (Map 91) the road could disrupt movements of caribou to and from insect-relief areas, potentially resulting in changes in productivity of the herd. Stipulation E-2 also states that permanent roads connecting production sites between separate oil fields may be considered. In general, construction of permanent roads has a negative impact on terrestrial mammals, especially caribou. Depending upon the location of the fields and the length of the permanent road, caribou movements may be disrupted. The potential for impact would be the greatest in the TLH Insect-relief Area (Map 91). The stipulation limits potential impacts to fish habitat from gravel extraction, disruption of natural water flow and drainage, and erosion. It could possibly reduce disturbance of polar bears that may den inland from the coast. Long-term structures alter the natural properties of the landscape and prohibiting long-term development outside the Planning Area will help retain the essentially natural viewsheds. This stipulation reduces the potential for burial of a relatively small proportion of breeding and foraging habitats, and reduces the potential disturbance from vehicles that may use the roads during the breeding season.	

<table>
<tr><th colspan="2">Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C (continued)</th></tr>
<tr><td>ROP E-5 Alternatives A and B. Pipelines and roads shall be designed to facilitate caribou and subsistence user passage.</td><td>ROP E-5 for Alternative C. Above-ground pipelines shall be elevated at least 5 ft, as measured from the ground to the bottom of the pipe, except where the pipeline intersects a road, pad, or a ramp installed to facilitate wildlife passage and subsistence passage and access.

Lessees shall separate elevated pipelines from roads by a minimum of 500 ft, if feasible. Separating roads from pipelines may not be feasible within narrow land corridors between lakes and where pipe and road converge on a drill pad.</td></tr>
<tr><td colspan="2">The protective measure offered by ROP E-5 does not provide any protective benefit for: Soils, Paleontological Resources, Estuarine Water Quality, Freshwater Quality, Vegetation, Non-Marine Fish, Marine Fish, Birds, Marine Mammals, Bowhead Whales, Threatened and Endangered Eiders, Cultural Resources, Recreation, Visual Resources, Sociocultural Systems, Environmental Justice, Air Quality, or the Regional Economy

Both versions of ROP E-5 provide some non-specific benefits for: Coastal Zone Resources.

ROP E-5 for Alternative C provides additional environmental protection above that of Stipulation D-1 for Alternatives A and B for: Terrestrial Mammals and Subsistence-Harvest Patterns.

While moose easily cross under the TAPS, they seem to prefer pipelines that are elevated more than 5 ft. Caribou need pipelines that are elevated at least 5 ft above ground. Elevating pipelines less than 5 ft could facilitate movement by caribou but not to the fullest extent. Extensive data exist that 5 ft is the minimum and this standard should be used. Separating roads and pipelines also facilitates caribou crossing. The greater protection for caribou would result in fewer disturbances to subsistence activities.</td></tr>
</table>

Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C (continued)	
ROP E-6 for Alternatives A and B. Permanent oil and gas facilities upon or within 500 ft of shallow lakes, streams, lake beds, estuaries, and their active floodplain will only be approved if the applicant can demonstrate to the satisfaction of the AO that adverse impacts to fish, wildlife, vegetation, and the hydrologic condition are minimal. Essential pipeline and road crossings will be permitted on a case-by-case basis.	**Stipulation E-3 for Alternative C.** For those waterbodies not listed in stipulation E-1, permanent oil and gas facilities, including roads, airstrips, and pipelines, are prohibited upon or within 500 ft as measured from the active floodplain. Essential pipeline and road crossings will be permitted on a case-by-case basis.

The protective measure offered by ROP E-6 for Alternatives A and B and Stipulation E-3 for Alternative C do not provide any protective benefit for: **Soils, Vegetation, Marine Fish, Marine Mammals, Bowhead Whales, Cultural Resources, Recreation, Visual Resources, Sociocultural Systems, Environmental Justice, Air Quality,** or the **Regional Economy.**

Both ROP E-6 and Stipulation E-6 provide some non-specific benefits for: **Coastal Zone Resources**.

The benefits provided by ROP E-6 for Alternatives A and B are essentially the same as the benefis provided by Stipulation E-3 for Alternative C for: **Paleontological Resources** and **Marine Fish** by protecting and reducing impacts in the floodplains and riparian zones.

Stipulation E-3 for Alternative C provides additional environmental protection above that of ROP E-6 for Alternatives A and B for: **Water Resources**, **Estuarine Water Quality**, **Freshwater Quality**, **Non-Marine Fish**, **Birds**, **Terrestrial Mammals**, **Threatened and Endangered Eiders**, and **Subsistence-Harvest Patterns.** The required setback for permanent facilities from the floodplain of rivers and lakes reduces the likelihood of spills, thermokarst sediment erosion, water diversions, or impoundments impacting a lake or river. This is in agreement with ADF&G and ADEC requirements. The stipulation is slightly more protective of terrestrial mammal habitat in that it strictly prohibits permanent facilities within 500 ft of the active floodplain reducing loss and degradation of riparian habitats. The definite setback lessens the potential for impacts to water quality, fish habitat, and fish by protecting channel integrity, bank stability, and riparian vegetation. Any oil spills are less likely to reach the water. The setback of permanent oil and gas facilities from estuaries would reduce the likelihood of contaminants reaching the estuaries. Since the marine fish often use these estuaries as nursery and feeding areas, these mitigating measures would reduce the amount of disturbance and potential contamination in the near shore marine waters. It lessens the effects to raptors, other birds and threatened eiders within the surrounding area by reducing the potential for burial (loss) of a relatively small proportion of available breeding and foraging habitats, disturbance if roads and airstrips are used during the breeding season, hydrocarbon contamination in case of pipeline leaks, and forage fish kill, would be avoided. It lessens disturbances to subsistence activities by providing greater protection of subsistence resources and traditional hunting and fishing camps.

Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C (continued)	
ROP E-7 for Alternatives A and B. Gravel mine site reclamation will be in accordance with a plan approved by the AO.	**Stipulation E-4 for Alternative C.** Gravel mine sites are prohibited within the active floodplain of a river, stream, or lake. Gravel mine site reclamation will be in accordance with a plan approved by the AO.

The protective measure offered by ROP E-7 for Alternatives A and B and Stipulation E-4 for Alternative C do not provide any protective benefit for: **Estuarine Water Quality, Vegetation, Non-Marine Fish, Marine Fish, Birds, Marine Mammals, Bowhead Whales, Cultural Resources, Recreation, Visual Resources, Sociocultural Systems, Environmental Justice, Air Quality,** or the **Regional Economy.**

Both ROP E-7 and stipulation E-4 provide some non-specific benefits for: **Coastal Zone Resources**.

The benefits provided by ROP E-7 for Alternatives A and B are essentially the same as the benefit provided by Stipulation E-4 for Alternative C for: **Soils**, **Freshwater Quality,** and **Subsistence Harvest Patterns** by reducing potential impacts from mining operations**.**

Stipulation E-4 for Alternative C provides additional environmental protection above that of ROP E-7 for Alternatives A and B for: **Paleontological Resources**, **Water Resources, Birds**, **Terrestrial Mammals**, **Threatened and Endangered Eiders**, **Cultural Resources**, **Recreation**, **Visual Resources, Subsistence-Harvest Patterns, Sociocultural Systems,** and **Environmental Justice**. The stipulation requires setbacks for gravel mine sites from the floodplain of rivers and lakes; the likelihood of thermokarst sediment erosion, water diversions, or impoundments impacting a lake or river is greatly reduced. This is in agreement with ADF&G and ADNR regulations. This measure would prevent loss and degradation of riparian habitat that is important to grizzly bears, moose and wolverine. Reclamation of gravel mine sites does not ensure that the original habitat will be restored, resulting in a net loss of this type of habitat. Paleontological resources and cultural resources are more likely to occur along the banks of waterbodies, especially lakes and rivers, the stipulation prohibiting gravel mine sites from the active floodplain of such waterbodies this stipulation would help to protect these resources. People floating rivers in a Semi-Primitive Motorized area expect a certain level of opportunity. This stipulation reduces the likelihood of having a gravel mine within viewshed or within the river area. The stipulation helps reduce long-term disturbances of natural vegetation and the alternation of natural properties of the landscape. The potential for burial (loss) of a relatively small proportion of available breeding and foraging habitats, disturbance if roads and airstrips were used during the breeding season, hydrocarbon contamination in case of pipeline leaks, and forage fish kill, would be avoided.

Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C (continued)	
ROP E-8 for Alternatives A and B. Coastal facilities shall be designed, sited, and constructed to prevent significant changes to near shore oceanographic circulation patterns and water-quality characteristics (e.g., salinity, temperature, suspended sediments) that result in measurements exceeding water-quality criteria, and must maintain free passage of marine and anadromous fish.	Stipulation E-5 for Alternative C. Causeways and docks are prohibited in river mouths or deltas. Artificial gravel islands and bottom-founded structures are prohibited in river mouths or active stream channels on river deltas, except as provided in the paragraphs below. Approved causeways, docks, artificial gravel islands, and bottom-founded structures, shall be designed, sited, and constructed to prevent significant changes to near shore oceanographic circulation patterns and water-quality characteristics (e.g., salinity, temperature, suspended sediments) that result in measurements exceeding water-quality criteria, and must maintain free passage of marine and anadromous fish. A monitoring program will be required to address the objectives of water quality and free passage of fish. Additional mitigation shall be required where significant deviation from these objectives occurs.
The protective measure offered by ROP E-8 for Alternative A and B and Stipulation E-5 for Alternative C does not provide any protective benefit for: **Soils, Vegetation**, most **Birds**, **Marine Mammals, Bowhead Whales, Recreation, Visual Resources, Sociocultural Systems, Environmental Justice, Air Quality,** and the **Regional Economy**. Both ROP E-8 and Stipulation E-5 provide some non-specific benefits for: **Coastal Zone Resources**. The benefits provided by ROP E-8 for Alternatives A and B are essentially the same as the benefits provided by Stipulation E-5 for Alternative C for: **Paleontological Resources, Marine Fish**, **Terrestrial Mammals**, and **Cultural Resources**. This mitigation would likely benefit migratory fish like the Arctic cisco, since they migrate annually along the coast in the nearshore waters. It would benefit non-migratory marine fish to a lesser degree, since they are not as dependent upon nearshore habitat, where oil and gas facilities may be placed. Stipulation E-5 for Alternative C provides additional environmental protection above that of ROP E-8 for Alternatives A and B for: **Water Resources**, **Non-Marine Fish**, some **Birds**, **Threatened and Endangered Eiders,** and **Subsistence-Harvest Patterns**. This measure prohibits causeways and permanent facilities from rivers and deltas; the likelihood of spills, thermokarst sediment erosion, or water diversions or impoundments impacting a river is greatly reduced. This is consistent with ADF&G and ADNR agreements. A monitoring program would enable the AO to verify whether significant changes to circulation patterns and water quality are occurring. Mitigation to protect fish could then be incorporated if necessary. The potential for burial (loss) of, and disturbance in, a relatively small proportion of available waterfowl and threatened eider foraging habitat would be avoided. This measure provides greater protection of subsistence resources (marine fish) because of fewer disturbances to subsistence activities.	

<table>
<tr><th colspan="2">Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C (continued)</th></tr>
<tr><td>ROP F-1 for Alternatives A and B. All aircraft use shall be conducted in a manner that will minimize impacts to wildlife and birds.</td><td>ROP F-1 for Alternative C. Aircraft shall maintain an altitude of at least 1,500 ft above ground level (AGL) when within 1/2 mile of cliffs identified as raptor nesting sites from April 15 through August 15 and within 1/2 mile of known gyrfalcon nest sites from March 15 to August 15, unless doing so would endanger human life or violate safe flying practices. Permittees shall obtain information from BLM necessary to plan flight routes when flights may go near falcon nests.

Stipulation F-1. Aircraft shall maintain an altitude of at least 1,000 ft AGL (except for takeoffs and landings) over caribou winter ranges from October 1 through May 15.

Stipulation F-2. Aircraft shall maintain an altitude of at least 2,000 ft AGL over the caribou insect-relief area from June 20 through July 31, unless doing so would endanger human life or violate safe flying practices</td></tr>
<tr><td colspan="2">The protective measure offered by ROP F-1, Stipulation F-1, and Stipulation F-2 does not provide any protective benefit for: Soils, Paleontological Resources, Water Resources, Estuarine Water Quality, Freshwater Quality, Vegetation, Non-Marine Fish, Marine Fish, Marine Mammals, Bowhead Whales, Cultural Resources, Recreation, Visual Resources, Sociocultural Systems, Environmental Justice, Air Quality, and the Regional Economy.

ROP F-1 and both stipulations provide some non-specific benefits for: Coastal Zone Resources.

ROP F-1, Stipulation F-1, and Stipulation F-2 for Alternative C provide additional environmental protections above that of ROP F-1 for Alternatives A and B for: Birds, Terrestrial Mammals, Threatened and Endangered Eiders, and Subsistence-Harvest Patterns. Stipulations F-1 and F-2 have specific requirements that will result in fewer disturbance impacts to terrestrial mammals from aircraft use. The potential for aircraft disturbance of raptors and other bird species and threatened eiders within the specified areas (representing for most species, other than raptors, a relatively small proportion of available nesting and foraging habitat) would be decreased. Stipulation F-1 applies only to ptarmigan, ravens, or other species present in winter. The greater protection of subsistence resources (caribou) would result in fewer disturbances to subsistence caribou hunt.</td></tr>
</table>

Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C (continued)	
Stipulation J-1 for Alternatives A and B. If necessary to construct permanent facilities within the Colville River Special Area, all reasonable and practicable efforts shall be made to locate them as distant from raptor nests as practical and feasible, but consistent with the following: alteration of limited, high quality habitat that could significantly reduce prey availability shall be minimized. Of particular concern are ponds, lakes, wetlands, and riparian habitats.	**Stipulation J-1 for Alternative C.** If necessary to construct permanent facilities within the Colville River Special Area, all reasonable and practicable efforts shall be made to locate them as distant from raptor nests as feasible, but consistent with the following: Within 15 miles of nest sites, alteration of limited, high quality habitat that could significantly reduce prey availability shall be prohibited. Of particular concern are ponds, lakes, wetlands and riparian habitats.
The protective measure offered by Stipulation J-1 does not provide any protective benefit for: **Soils, Paleontological Resources, Estuarine Water Quality, Vegetation, Non-Marine Fish, Marine Fish, Terrestrial Mammals, Marine Mammals, Bowhead Whales, Cultural Resources, Recreation, Visual Resources, Subsistence-Harvest Patterns, Sociocultural Systems, Environmental Justice, Air Quality,** and the **Regional Economy**. Both stipulations provide some non-specific benefits for: **Coastal Zone Resources**. Stipulation J-1 for Alternative C provides additional environmental protection above that of Stipulation J-1 for Alternatives A and B for: **Water Resources**, **Freshwater Quality**, **Birds**, and **Threatened and Endangered Eiders**. With the setbacks for permanent facilities from the wetland areas, rivers, and lakes, the likelihood of spills, thermokarst sediment erosion, or water diversions or impoundments impacting a lake or river is reduced. This is consistent with agreements with ADF&G and ADNR. The potential for burial (loss) or destruction of raptor high quality foraging habitat and breeding and foraging habitats for other bird species and threatened eiders (representing for species other than raptors a relatively small proportion of available habitat) is decreased.	

<table>
<tr><th colspan="2">Comparison of the Effectiveness of Stipulations and Required Operating Procedures for Alternatives A, B, and C (continued)</th></tr>
<tr><td>No corresponding stipulation for Alternatives A and B.</td><td>Stipulation J-2 for Alternative C. Petroleum exploration and production activities are prohibited within 1/2 mile of occupied grizzly bear dens, identified by the ADF&G, unless alternative mitigation measures are approved by the AO in consultation with appropriate Federal, State, and NSB regulatory and resource agencies.</td></tr>
<tr><td colspan="2">The protective measure offered by Stipulation J-2 for Alternative C does not provide any protective benefit for: Soils, Paleontological Resources, Water Resources, Estuarine Water Quality, Freshwater Quality, Vegetation, Non-Marine Fish, Marine Fish, Birds, Marine Mammals, Bowhead Whales, Threatened and Endangered Eiders, Cultural Resources, Recreation, Visual Resources, Subsistence-Harvest Patterns, Sociocultural Systems, Environmental Justice, Air Quality, and the Regional Economy.

Stipulation J-2 for Alternative C provides environmental protection for: Terrestrial Mammals (Grizzly Bears) and Coastal Zone Management. For this mitigation measure to be effective, it is necessary to know the location of occupied bear dens. However, if the effort were made to locate bear dens, it would reduce the potential for disturbance of hibernating bears and resultant abandonment of dens and young. In areas of higher bear densities, it could provide substantial protection for bears.</td></tr>
</table>

Appendix 12 B. Effectiveness of Stipulations and Required Operating Procedures for the Preferred Alternative

A. Waste Prevention, Handling. Disposal, Spills, and Public Safety
A-1 Required Operating Procedure
Objective: To protect the health and safety of oil field workers and the general public by avoiding the disposal of solid waste and garbage near areas of human activity. **Requirement/Standard:** Areas of operation shall be left clean of all debris.
A-1 Effectiveness
A-1 would limit the impacts on **wild and scenic river** values by limiting reductions in water quality, reductions in critical flows, obstruction to fish passage, loss of critical winter habitat, and declines in outstandingly remarkable values for fish, wildlife, and subsistence use. A-1 would protect **water resources and water quality** by reducing the potential for solid waste and garbage to contaminate surface waters. A-1 would reduce the potential effects of human refuse on grizzly bears, arctic foxes, and other **terrestrial mammals.** A-1 is expected to reduce potential **marine pollution** and effects on **marine mammals and fish** in the Dease Inlet/Admiralty Bay area where oil exploration and development may occur under the Preferred Alternative and prevent the attraction of polar bears to camp sites that could result in the taking of polar bears in human/bear interactions. A-1 would help protect the area's **recreation/wilderness** resources as well as the users. A-1 would provide increased protection for terrestrial mammals, thus reducing the potential for impacts on **subsistence-harvest patterns.**
A-2 Required Operating Procedure
Objective: To minimize impacts on the environment from non-hazardous waste generation. Encourage continuous environmental improvement. Protect the health and safety of oil field workers and the general public. Avoid human-caused changes in predator populations. **Requirement/Standard:** Lessees/permittees shall prepare and implement a comprehensive waste management plan for all phases of exploration and development including seismic activities. The plan shall be submitted to the AO for approval, in consultation with Federal, State and North Slope Borough regulatory and resource agencies, as appropriate (based on agency legal authority and jurisdictional responsibility), as part of a plan of operations or other similar permit application. The plan shall consider and take into account the following requirements: **a) Methods to avoid attracting wildlife to food and garbage:** All feasible precautions shall be taken to avoid attracting wildlife to food and garbage. (A current list of approved precautions, specific to type of permitted use, can be obtained from the AO.) **b) Disposal of putrescible waste:** Current requirements prohibit the burial of garbage. Lessees and permitted users shall have a written procedure to ensure that the handling and disposal of putrescible waste will be accomplished in a manner that prevents the attraction of wildlife. All putrescible waste shall be incinerated, backhauled, or composted in a manner approved by the AO. All solid waste, including incinerator ash, shall be disposed of in an approved waste-disposal facility in accordance with U.S. Environmental Protection Agency (EPA) and Alaska Department of Environmental Conservation (ADEC) regulations and procedures. The burial of human waste is prohibited except as authorized by the AO.

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

A-2 Required Operating Procedure (continued)

c) Disposal of pumpable waste products: Except as specifically provided, BLM currently requires all pumpable solid, liquid, and sludge waste be disposed of by injection in accordance with EPA, ADEC, and the Alaska Oil and Gas Conservation Commission regulations and procedures. On-pad temporary muds and cuttings storage as approved by ADEC will be allowed as necessary to facilitate annular injection and/or backhaul operations.

d) Disposal of wastewater and domestic wastewater: BLM currently prohibits wastewater discharges or disposal of domestic wastewater into bodies of fresh, estuarine, and marine water, including wetlands, unless authorized by the National Pollution Discharge Elimination System (NPDES) or State permit.

A-2 Effectiveness

A-2 would lessen impacts on some **birds** by preventing artificial enhancement or concentration of bird predators by controlling availability of food and garbage; also, pollution of waterbodies by disposal of waste materials, which could cause toxic reactions in waterbirds or their prey, is prohibited.

A-2 (a, b) would help protect the area's **recreation/wilderness** resources as well as the users.

A-2 would provide increased protection for terrestrial mammals thus lessening impacts to **subsistence harvest patterns**.

A-2 would limit the impacts on **wild and scenic rivers** values by limiting reductions in water quality, loss of critical winter habitat, and declines in outstandingly remarkable values for fish, wildlife, and subsistence use.

A-2 would protect **water resources and water quality** by regulating garbage, wastewater, and drilling wastes.

A-2c would reduce the impacts to **vegetation** by reducing the probability of pumpable waste products reaching the tundra or spreading further once they reach the tundra.

A-2 could lessen impacts to **endangered and threatened species** by preventing artificial enhancement or concentration of eider predators by controlling availability of food and garbage; also, pollution of waterbodies by disposal of waste materials, which could cause toxic reactions in eiders or their prey, is prohibited.

A-2 would reduce the potential effects of human refuse on grizzly bears, arctic foxes, and other **terrestrial mammals**.

A-2 would reduce the likelihood of liquid waste and human refuse from contaminating environments inhabited by **marine fishes**.

A-3 Required Operating Procedure

Objective: To minimize pollution through effective hazardous-materials contingency planning

Requirement/Standard: For oil- and gas-related activities, a Hazardous-Materials Emergency-Contingency Plan shall be prepared and implemented before transportation, storage, or use of fuel or hazardous substances. The plan shall include a set of procedures to ensure prompt response, notification, and cleanup in the event of a hazardous substance spill or threat of a release. Procedures applicable to fuel and hazardous substances handling (associated with transportation vehicles) may consist of Best Management Practices if approved by the AO. The plan shall include a list of resources available for response (e.g., heavy-equipment operators, spill-cleanup materials or companies), and names and phone numbers of Federal, State, and NSB contacts. Other Federal and State regulations may apply and require additional planning requirements. All staff shall be instructed regarding these procedures.

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

A-3 Effectiveness

A-3 could reduce contamination risk to **birds** from accidental spills of fuel or other hazardous substances by preventing their entry into waterbodies and wetlands through implementation of a Hazardous-Materials Emergency-Contingency Plan.

A-3 would reduce potential impacts to **subsistence-harvest patterns** by assuring prompt response to spills thus minimizing impacts to **birds**, **marine mammals**, **fish** and fish habitat resulting from fuel use, handling, and storage of fuels and hazardous materials.

A-3 would limit the impacts that oil and gas exploration and development will have on **wild and scenic river** values. Without this ROP we expect greater impacts from spills, resulting reductions in water quality, and declines in outstandingly remarkable values for fish, wildlife, and subsistence use.

A-3 would protect **water resources and water quality** by addressing fuel and chemical storage, fuel handling, spill prevention and cleanup plans.

A-3 would reduce the acreage of impacts to **vegetation** by reducing the probability of oil spills reaching the tundra or spreading further if they reach the tundra and it would reduce the level of impacts by providing for better clean-up of spills.

A-3 would help to prevent large fuel or crude oil spills, and consequently reduce the small potential for impacts to **paleontological and cultural resources** from spill clean-up.

A-3 could lessen impacts to **endangered and threatened species** by reducing contamination risk to eiders from accidental spills of fuel or other hazardous substances by preventing entry of these substances into waterbodies and wetlands through implementation of a Hazardous-Materials Emergency-Contingency Plan.

A-3 would provide increased protection to **freshwater fish** and fish habitat during fuel use, handling, and storage.

A-3 would reduce the potential for introducing fuel spills into environments inhabited by **marine fishes**. Because accidental spills occur, the preparation for and response thereto has the potential to greatly mitigate the magnitude of potentially adverse effects of hydrocarbon spills on marine fishes. This may reduce the number of individual fishes impacted by a spill and the intensity of lethal and sub lethal exposure.

A-3 would reduce the potential effects of spills on grizzly bears, arctic foxes, and other **terrestrial mammals.**

A-4 Required Operating Procedure

Objective: To minimize the impact of contaminants on fish, wildlife and the environment, including wetlands, marshes and marine waters, as a result of fuel, crude oil and other liquid chemical spills. Protect subsistence resources and subsistence activities. Protect public health and safety.

Requirement/Standard: Before initiating any oil and gas or related activity or operation, including field research/surveys and/or seismic operations, lessees/permittees shall develop a comprehensive spill prevention and response contingency plan per 40 CFR 112 (OPA). The plan shall consider and take into account the following requirements:

a) On-site clean-up materials. Sufficient oil-spill-cleanup materials (absorbents, containment devices, etc.) shall be stored at all fueling points and vehicle-maintenance areas and shall be carried by field crews on all overland moves, seismic work trains, and similar overland moves by heavy equipment.

b) Storage Containers. Fuel and other petroleum products and other liquid chemicals shall be stored in proper containers at approved locations. Except during overland moves and seismic operations, fuel, other petroleum products, and other liquid chemicals designated by the AO in excess of 1,320 gallons in storage capacity shall be stored within an impermeable lined and diked area or within approved alternate storage containers such as over packs, capable of containing 110 percent of the stored volume.

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

c) Liner Materials. Liner material shall be compatible with the stored product and capable of remaining impermeable during typical weather extremes expected throughout the storage period.
d) Permanent Fueling Stations. Permanent fueling stations shall be lined or have impermeable protection to prevent fuel migration to the environment from overfills and spills.
e) Proper Identification of Containers. All fuel containers, including barrels and propane tanks, shall be marked with the responsible party's name, product type, and year filled or purchased.
f) Notice of Reportable Spills. Notice of any reportable spill (as required by 40 CFR 300.125 and 18 AAC 75.300) shall be given to the AO as soon as possible, but no later than 24 hours after occurrence.

A-4 Effectiveness

A-4 could reduce contamination risk to **birds** from accidental spills of fuel or liquid chemicals during oil and gas activities by preventing their entry into waterbodies and wetlands through implementation of a comprehensive spill prevention and response contingency plan which includes specifications on cleanup, materials, storage containers, and liner materials.
A-4 b, c, and d would greatly increase the protection of **wilderness and recreation resources**. This ROP would help reduce, if not eliminate, fuel spills in pristine areas. This ROP would not unduly restrict recreationists from using the area's resources.
A-4 would reduce impacts on **subsistence-harvest patterns** by reducing the potential for impacts on birds, terrestrial mammals, fish and fish habitat, and marine mammals during fuel use, handling, and storage.
A-4 would limit the impacts that oil and gas exploration and development will have on **wild and scenic river** values. Without this ROP we would expect greater impacts from spills, reductions in water quality, loss of critical winter habitat, and declines in outstandingly remarkable values for fish, wildlife, and subsistence use.
A-4 would protect **water resources and water quality** by regulating fuel and chemical storage, fuel handling; spill prevention and cleanup plans.
A-4a-e would reduce the acreage of impacts to **vegetation** by reducing the probability of oil spills reaching the tundra or spreading further if they reach the tundra and would reduce the level of impacts to vegetation, if not the areal extent of impacts, by providing better clean-up of spills.
A-4 b, c, d, and f would help to prevent large fuel or crude oil spills, and consequently reduce the small potential for impacts to **paleontological and cultural resources** from spill cleanup.
A-4 could reduce impacts to **endangered and threatened species** by preventing entry of fuel or liquid chemicals into waterbodies and wetlands thus reducing contamination risk to eiders from accidental spills of these substances during oil and gas activities.
A-4 would provide increased protection to **fish and fish habitat** during fuel use, handling and storage.
A-4 would reduce the potential for introducing fuel and oil spills into environments inhabited by **marine fishes**. Because accidental spills occur, the preparation for, and response thereof, has the potential to greatly mitigate the magnitude of potentially adverse effects of hydrocarbon spills on marine fishes. Hence, this ROP may reduce the number of individual fishes impacted by a spill and the intensity of lethal and sub lethal exposure.
A-4 would reduce the potential effects of spills and human refuse on grizzly bears, arctic foxes, and other **terrestrial mammals**.

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)
A-5 Required Operating Procedure
Objective: To minimize the impact of contaminants from refueling operations on fish, wildlife and the environment. **Requirement/Standard**: Refueling of equipment within 500 ft of the active flood plain of any fish-bearing water body and 100 ft from non-fish-bearing water bodies is prohibited. Small caches (up to 210 gallons) for motorboats float planes, ski planes, and small equipment, e.g. portable generators and water pumps, will be permitted. The AO may allow storage and operations at areas closer than the stated distances if properly designed to account for local hydrologic conditions.
A-5 Effectiveness
A-5 could reduce the potential impacts to **birds** by prohibiting the refueling of equipment within 500 ft of the active floodplain of fish-bearing and 100 ft of the active floodplain of non-fish-bearing water bodies thus preventing spilled fuel from entering water bodies where fish prey of fish-eating birds (e.g., loons, mergansers, terns) or individual water birds could become contaminated and die (adversely affecting the breeding success of these water bird species). A-5 would greatly increase the protection of **wilderness and recreation** resources and benefit the recreation/wilderness resources and users of the area. This ROP would help reduce, if not eliminate, the possibilities of larger fuel spills in pristine areas, or areas that can ill afford any type of fuel spill. This ROP would not unduly restrict recreationists. A-5 would reduce impacts on **subsistence-harvest patterns** by providing greater protection for terrestrial mammals, fish and fish habitat, and birds during fuel use, handling, near rivers and lakes. A-5 limits the impacts that oil and gas exploration and development will have on **wild and scenic river** values. Without this ROP we expect greater impacts from spills, reductions in water quality, loss of critical winter habitat, and declines in outstandingly remarkable values for fish, wildlife, and subsistence use. A-5 would protect **water resources and water quality** by restricting fuel handling near lakes and rivers. A-5 could reduce impacts to **endangered and threatened species** by preventing spilled fuel from reaching waterbodies where individual eiders (including nesting or brood-rearing eiders occupying adjacent habitats) could become contaminated and die or if not lethal could adversely affect breeding success. A-5 would provide increased protection to **freshwater fish and fish habitat** during fuel use, handling, and storage. A-5 would reduce the potential for introducing fuel spills into environments inhabited by **marine fishes**. This ROP may reduce the number of individual fishes impacted by a spill and the intensity of lethal and sublethal exposure. A-5 would reduce the potential effects of fuel spills on grizzly bears, arctic foxes, and other **terrestrial mammals.**
A-6 Required Operating Procedure
Objective: Minimize the impact on fish, wildlife and the environment from contaminants associated with the exploratory drilling process. **Standard/Requirement:** Surface discharge of reserve-pit fluids is prohibited unless authorized by applicable NPDES, ADEC, and NSB permits (as appropriate) and approved by the AO.
A-6 Effectiveness
A-6 would reduce impacts on **subsistence-harvest patterns** by regulating the discharge of reserve pit fluids and thus minimizing impacts to fish and fish habitat and birds.

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)
A-6 limits the impacts that oil and gas exploration and development will have on **wild and scenic river** values by regulating the discharge of reserve pit fluids. Without this ROP we expect greater reductions in water quality and declines in outstandingly remarkable values for fish, wildlife, and subsistence use. A-6 would protect **water resources and water quality, freshwater fish habitat and fish, marine fishes, terrestrial mammals** and reduce the acreage of impacts to **vegetation** by regulating the discharge of reserve pit fluids.
A-7 Required Operating Procedure
Objective: To minimize the impacts to the environment of disposal of produced fluids recovered during the development phase on fish, wildlife, and the environment. **Requirement/Standard**: Procedures for the disposal of produced fluids shall meet the following requirements: a) In upland areas, including wetlands, disposal will be by subsurface-disposal techniques. The AO may permit alternate disposal methods if the lessee demonstrates that subsurface disposal is not feasible or prudent and the alternative method will not result in adverse environmental effects. b) In marine waters, approval of discharges by the AO will be based on a case-by-case review of environmental factors and consistency with the conditions of an NPDES permit. Discharge of produced fluids will be prohibited at locations where currents and water depths, in combination with other conditions, are not adequate to prevent impacts to known biologically sensitive areas. Alternate disposal methods will require an NPDES permit certified by the State.
A-7 Effectiveness
A-7 would reduce impacts on **subsistence-harvest patterns** by regulating the disposal of produced fluids thus minimizing impacts to fish and fish habitat and birds. A-7 would limit the impacts that oil and gas exploration and development will have on **wild and scenic river** values by regulating the disposal of produced fluids. Without this ROP we expect greater reductions in water quality and declines in outstandingly remarkable values for fish, wildlife, and subsistence use. A-7 would protect **water resources and water quality, freshwater fish habitat and fish, marine fishes, terrestrial mammals** and reduce the acreage of impacts to **vegetation** by regulating the disposal of produced fluids.
A-8 Required Operating Procedure
Objective: Minimize conflicts resulting from interaction between humans and bears during leasing and associated activities. **Requirement/Standard:** Oil and gas lessees and their contractors and subcontractors will, as a part of preparation of lease operation planning, prepare and implement bear-interaction plans to minimize conflicts between bears and humans. These plans shall include measures to: a) Minimize attraction of bears to the drill sites. b) Organize layout of buildings and work areas to minimize human/bear interactions. c) Warn personnel of bears near or on drill sites and identify proper procedures to be followed. d) Establish procedures, if authorized, to deter bears from the drill site. e) Provide contingencies in the event bears do not leave the site or cannot be deterred by authorized personnel. f) Discuss proper storage and disposal of materials that may be toxic to bears. g) Provide a systematic record of bears on the site and in the immediate area.

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

A-8 Effectiveness

A-8 would benefit the **recreation and wilderness** users of the area by minimizing acclimatization of bears to human contact.
A-8 would benefit **terrestrial mammals** by requiring a bear-interaction plan that would reduce impacts to grizzly bears by reducing human/bear interactions. This ROP would benefit bears by reducing both the number of bears killed in "defense of life and property" and the number of bears becoming habituated to anthropogenic food sources.

B. Water Use for Permitted Activities

B-1 Required Operating Procedure

Objective: To maintain populations of, and adequate habitat for, fish and invertebrates.
Requirement/Standard: Water withdrawal from rivers and streams during winter is prohibited.

B-1 Effectiveness

B-1 could reduce impacts to some **bird** species by preventing winter die-off of fish prey of fish-eating birds (e.g., loons, mergansers, terns), which could adversely affect the breeding success of these water bird species.
B-1 would reduce impacts on **subsistence-harvest patterns** by providing increased protection to fish and fish habitat by prohibiting water withdrawals from rivers and streams.
B-1 would preserve instream flows in eligible **wild and scenic** rivers and limit the impacts that oil and gas exploration and development would have on river values. Without this restriction we would expect greater impacts from reductions in water quality, reductions in critical flows, obstruction to fish passage, loss of critical winter habitat, and declines in outstandingly remarkable values for fish, wildlife, and subsistence use.
B-1 would protect **water resources and water quality** by prohibiting water withdrawal from rivers during winter.
B-1 would prohibit water withdrawals from rivers and protect overwintering habitat for **freshwater fish**.

B-2 Required Operating Procedure

Objective: To maintain natural hydrologic regimes in soils surrounding lakes and ponds and maintain populations of, and adequate habitat for, fish and invertebrates.
Requirement/Standard: Water withdrawal from lakes may be authorized on a site-specific basis depending on size, water volume, depth and fish population and species diversification. Current water withdrawal requirements specify:
a) Water withdrawals from any fish bearing lake 7 ft or deeper shall be limited to 15 percent of the estimated free water volume located beneath ice.
b) Water withdrawals from lakes with depths between 5 and 7 ft that contain only ninespine stickleback and/or Alaska blackfish are limited to up to 30 percent of the under-ice volume.
c) Water withdrawal may be authorized from any lake if the proponent demonstrates that no fish exist in the lake.
d) A water-monitoring plan may be required to assess draw down and water quality changes before, during, and after pumping any fish-bearing lake.
e) The removal of naturally grounded ice may be authorized from lakes and shallow rivers on a site-specific basis depending upon its size, water volume, depth, and fish population and species diversification.
f) Removed ice aggregate shall be included in the 15 percent or 30 percent, whichever is the appropriate case, withdrawal limits unless otherwise approved.

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)
g) Any water intake structures in fish-bearing waters shall be designed, operated and maintained to prevent fish entrapment, entrainment, or injury. h) Compaction of snow cover or snow removal from fish-bearing water bodies shall be prohibited except at approved ice road crossings, water pumping stations on lakes or areas of grounded ice.
B-2 Effectiveness
B-2 could reduce impacts to some **bird** species by preventing winter die-off of fish prey of fish-eating birds (e.g., loons, mergansers, terns), which could adversely affect the breeding success of these water bird species. B-2 would reduce impacts on **subsistence-harvest patterns** by providing increased protection to fish and fish habitat and by limiting water withdrawals from certain lakes. B-2 would protect **water resources and water quality** by regulating amounts of winter water withdrawals from lakes. B-2 would regulate water withdrawals from lakes and protect overwintering habitat for **freshwater fish**.
C. Winter Overland Moves and Seismic Work
The following stipulations and ROP's apply to overland moves, seismic work, and any similar cross country vehicle use of heavy equipment on non-roaded surfaces during the winter season. These restrictions do not apply to the use of such equipment on ice roads after they are constructed.
C-1 Required Operating Procedure
Objective: To protect grizzly bear, polar bear, and marine mammal denning and/or birthing locations. **Requirement/Standard:** a) Cross country use of heavy equipment and seismic activities are prohibited within ½ mi of occupied grizzly bear dens identified by ADF&G unless alternative mitigation measures are approved by the AO in consultation with ADF&G. b) Cross-country use of heavy equipment and seismic activities are prohibited within 1 mi of known or observed polar bear dens or seal birthing lairs. Operators shall consult with the U.S. Fish and Wildlife Service (FWS) and/or NOAA Fisheries, as appropriate, before initiating activities in coastal habitat between October 30 and April 15.
C-1 Effectiveness
C-1 would prevent some disturbances of **marine mammals** , specifically denning **polar bears** and seals. C-1 would reduce impacts on subsistence use patterns by protecting **grizzly bears** and some **marine mammals**. C-1 would benefit **terrestrial mammals** by requiring avoidance of known grizzly bear dens that would potentially reduce impacts to denning grizzly bears from seismic operations. The success of this ROP would be relative to the effort made to locate bear dens before initiating work.
C-2 Required Operating Procedure
Objective*:* To protect stream banks, minimize compaction of soils, and minimize the breakage, abrasion, compaction, or displacement of vegetation. **Requirement/Standard:** a) Ground operations shall be allowed only when frost and snow cover are at sufficient depths to protect the tundra. Ground operations shall cease when the spring snowmelt begins, approximately May 5 in the foothills area where elevations reach or exceed 500 ft and approximately May 15 in the northern coastal areas. The exact dates will be determined by the AO.

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)
b) Only low-ground-pressure vehicles shall be used for on-the-ground activities off ice roads or pads. A current list of approved vehicles can be obtained from the AO. Limited use of tractors equipped with wide tracks or "shoes" will be allowed to pull trailers, sleighs or other equipment with approved undercarriage. Note: This provision does not include the use of heavy equipment such as front-end loaders and similar equipment required during ice road construction. c) Bulldozing of tundra mat and vegetation, trails, or seismic lines is prohibited; however, on existing trails, seismic lines or camps, clearing of drifted snow is allowed to the extent that the tundra mat is not disturbed. d) To reduce the possibility of ruts, vehicles shall avoid using the same trails for multiple trips unless necessitated by serious safety or superseding environmental concern. This provision does not apply to hardened snow trails for use by low-ground-pressure vehicles such as Rolligons. e) The location of winter ice roads shall be designed and located to minimize compaction of soils and the breakage, abrasion, compaction, or displacement of vegetation. Offsets may be required to avoid using the same route or track in the subsequent year.
C-2 Effectiveness
C-2 would reduce impacts on subsistence use patterns by providing increased protection to **fish** and fish habitat. C-2a would benefit the wilderness resources and users of the area by limiting ground disturbance from winter use of heavy equipment and seismic activity. C-2 would limit the impacts that oil and gas exploration and development will have on **wild and scenic river** values. Without this ROP we would expect greater damage to stream banks at river crossings, and declines in outstandingly remarkable values for fish, wildlife, and subsistence use. C-2 would protect **water resources and water quality** by regulating overland moves, seismic work, ice-road construction, and other heavy equipment travel during the winter to limit impacts to water resources. C-2 would reduce the level of impacts to **vegetation** by reducing impacts of off-road vehicles. C-2a, c, and e would provide protection from seismic and overland move activities that could potentially disturb the vegetative mat and impact **paleontological and cultural** resources that are near the surface. C-2 would be beneficial to **freshwater fish habitat and fish** by reducing damage to stream banks at river crossings and reducing rutting and other damage to the vegetative mat. C-2 would put restrictions on the types of heavy equipment used and the seasons of allowable use and would be beneficial to **terrestrial mammals** by reducing the amount of habitat disturbed during overland moves and seismic work. Use of low-pressure vehicles may also reduce the mortality of small mammals. C-2 would provide protection for **soils** by reducing damage to stream banks, reducing rutting, and generally reducing impacts to vegetation by restricting seismic activity and overland moves to winter
C-3 Required Operating Procedure
Objective: To maintain natural spring runoff patterns, avoid flooding, prevent streambed sedimentation, protect water quality and protect stream banks. **Requirement/Standard:** Snow and ice bridges shall be removed, breached or slotted before spring breakup. Ramps and bridges shall be substantially free of soil and debris.

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

C-3 Effectiveness

C-3 would reduce impacts on **subsistence-use patterns** by providing increased protection to fish and fish habitat.
C-3 would limit the impacts that oil and gas exploration and development will have on **wild and scenic river** values. Without this ROP, we would expect greater reductions in water quality, reductions in critical flows, obstruction to fish passage and declines in outstandingly remarkable values for fish, wildlife, and subsistence use.
equipment travel during the winter.
C-3 would protect **water resources and water quality** by regulating overland moves, seismic work, ice-road construction, and other heavy
C-3 would be beneficial to **freshwater fish habitat and fish** by reducing stream sedimentation, maintaining water quality and maintaining natural spring runoff.

C-4 Required Operating Procedure

Objective: To avoid additional freeze down of deep-water pools harboring over-wintering fish and invertebrates used by fish.
Requirement/Standard: Rivers and streams shall be crossed at shallow riffles from point bar to point bar whenever possible.

C-4 Effectiveness

C-4 would reduce impacts on **subsistence-harvest patterns** by providing increased protection to fish and fish habitat.
C-4 limits the impacts that oil and gas exploration and development will have on **wild and scenic river** values. Without this ROP we expect greater loss of critical winter habitat, and declines in outstandingly remarkable values for fish and subsistence use.
C-4 would protect **water resources and water quality** by regulating heavy equipment travel across streams and rivers during the winter.
C-4 would protect **fish** by avoiding additional freezedown of overwintering pools in rivers.

D. Oil and Gas Exploratory Drilling

D-1 Lease Stipulation

Objectives: To protect fish-bearing rivers, streams and lakes from blowouts and to minimize alteration of riparian habitat.
Requirement/Standard: Exploratory drilling is prohibited in rivers and streams, as determined by the active floodplain, and fish-bearing lakes, except where the lessee can demonstrate on a site-specific basis that impacts would be minimal or it is determined that there is no feasible or prudent alternative.

D-1 Effectiveness

D-1 would reduce impacts on **subsistence-harvest patterns** by providing increased protection for terrestrial mammals.
D-1 would limit the impacts that oil and gas exploration and development will have on **wild and scenic** river values. Without this stipulation we would expect a greater risk of impacts from blowouts to water quality, critical winter habitat, and declines in outstandingly remarkable values for fish, wildlife, and subsistence use.
D-1 would protect **water resources and water quality** by prohibiting exploratory drilling in shallow lakes, streams, and floodplains.
D-1 would reduce impacts to **fish** and fish habitat during oil and gas exploratory drilling.
D-1 would reduce the potential for damage to the riparian habitats that are so important to many species of **terrestrial mammals**, including moose, bear and wolverine by prohibiting exploratory drilling in active floodplains. Disturbance impacts to wolverines and moose would also be reduced.

D-2 Lease Stipulation

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)
Objective: To minimize surface impacts from exploratory drilling. **Requirement/Standard:** Exploratory drilling shall be limited to temporary facilities such as ice pads, ice roads, ice airstrips, temporary platforms, etc., unless the lessee demonstrates that construction of permanent facilities such as gravel airstrips, storage pads, and connecting roads is environmentally preferable or necessary to carry out exploration more economically.
D-2 Effectiveness
D-2 could influence the level of effects on **estuarine water quality** by limiting exploratory drilling to temporary facilities such as ice pads. However, ice islands have been a relatively inexpensive and common type of facility for exploration in the nearshore Beaufort Sea, so ice islands might be the main type of exploration facility that would be used in NPR-A estuaries, even without the stipulation. Therefore, the stipulation might have only a minor effect on the types of exploration facilities that are used—and minor beneficial effect on estuarine water quality. In summary, the Stipulation would probably moderate the effects of exploration facilities and long causeways on estuarine water quality, but would not eliminate the effects.
E. Facility Design and Construction
E-1 Required Operating Procedure
Objective: To protect subsistence use and access to traditional subsistence hunting and fishing areas and minimize the impact of oil and gas activities on air, land, water, fish and wildlife resources. **Requirement/Standard**: All roads must be designed, constructed, maintained and operated to create minimal environmental impacts and to protect subsistence use and access to traditional subsistence hunting and fishing areas. Subject to approval by the AO, the construction, operation and maintenance of oil field roads is the responsibility of the lessee. Note: This provision does not apply to intercommunity or other permanent roads constructed with public funds for general transportation purposes. This preserves the opportunity to plan, design and construct public transportation systems to meet the economic, transportation, and public health and safety needs of the State of Alaska and/or communities within NPR-A.
E-1 Effectiveness
E-1 could be effective in minimizing effects on **soils** through the design and construction of facilities that incorporate design elements that may reduce erosion. E-1 would provide protection against impeding subsistence pursuits as set down in ANILCA (P.L. 96-487) and would also give mitigative relief for **sociocultural** impacts. Specifically for subsistence, ROP E-1 protects **subsistence use and access** to traditional hunting and fishing areas, Protection of subsistence pursuits helps to guard against potential sociocultural disruptions that then fall under the purview of **environmental justice**. E-1 would limit the impact that oil and gas exploration and development will have on **wild and scenic river** values. Without this ROP, we would expect greater impacts from road construction, and declines in outstandingly remarkable values for fish, wildlife, and subsistence use.
E-2 Lease Stipulation
Objective: To protect fish-bearing water bodies, water quality and aquatic habitats. **Requirement/Standard:** The design and location of permanent oil and gas facilities within 500 ft of fish-bearing or 100 ft of non fish-bearing waterbodies will only be approved on a case by case basis if the lessee can demonstrate that impacts to fish, water quality, and aquatic and riparian habitats are minimal. Note: Also refer to Area-Specific Stipulations and ROP's for Rivers (Stipulation K-1) and Deep Water Lakes (Stipulation K-2).

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)
E-2 Effectiveness
E-2 could reduce the loss (burial) of wetland habitats, important for many species of **birds** in particular breeding loons, waterfowl and shorebirds, by restricting approval for location of permanent oil and gas facilities within 500 ft of fish-bearing water bodies or 100 ft of non fish-bearing water bodies to those that are likely to cause minimal impacts to wildlife. E-2 would reduce impacts on **subsistence use patterns** by providing increased protection to fish and fish habitat by reducing the likelihood of fuel or oil contaminating waterbodies. E-2 would limit the impacts that oil and gas exploration and development will have on **wild and scenic river** values. Without this stipulation we would expect greater impacts from spills, reductions in water quality, and declines in outstandingly remarkable values for fish, wildlife, and subsistence use. E-2 would protect **water resources and water quality** by limiting certain facility, structure, and gravel mine site design and construction impacts near lakes and rivers. E-2 would not reduce the acreage of **vegetation** impacted by an action, but might shift the impacts from more valuable wetland or riparian vegetation types to habitats perceived as lesser in value. E-2 would reduce impacts to **endangered and threatened species** by reducing the loss (burial) of wetland habitats, important for breeding eiders, by restricting approval for location of permanent oil and gas facilities within 500 ft of fish-bearing water bodies or 100 ft of non fish-bearing water bodies to those that are likely to cause minimal impacts to wildlife. E-2 would be beneficial to **freshwater fish habitat and fish.**
E-3 Lease Stipulation
Objective: To maintain free passage of marine and anadromous fish and to protect subsistence use and access to traditional subsistence hunting and fishing.
E-3 Lease Stipulation
Requirement/Standard: Causeways and docks are prohibited in river mouths or deltas. Artificial gravel islands and bottom-founded structures are prohibited in river mouths or active stream channels on river deltas. Causeways, docks, artificial islands, and bottom-founded structures shall be designed to ensure free passage of marine and anadromous fish and to prevent significant changes to nearshore oceanographic circulation patterns and water quality characteristics. A monitoring program may be required to address the objectives of water quality and free passage of fish.
E-3 Effectiveness
E-3 would provide protection against impeding subsistence pursuits as set down in ANILCA (P.L. 96-487) and would also mitigate for **sociocultural** impacts, as well. Specifically for subsistence, ROP E-3 protects **subsistence use and access** to traditional hunting and fishing areas, Protection of subsistence pursuits helps to guard against potential sociocultural disruptions that then fall under the purview of **environmental justice** E-3 would limit the impacts that oil and gas exploration and development will have on **wild and scenic river** values. Without this stipulation we would expect greater impacts from spills, reductions in water quality, reductions in critical flows, obstruction to fish passage and declines in outstandingly remarkable values for fish, wildlife, and subsistence use. E-3 would protect **water resources and water quality** by prohibiting causeways and docks in river mouths and deltas and by setting certain design criteria for causeways, docks and other structures.

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)
E-3 would reduce potential for disruption of **freshwater fish** passage.
E-4 Required Operating Procedure
Objective*:* To minimize the potential for pipeline leaks, the resulting environmental damage and industrial accidents. **Requirement/Standard:** All pipelines shall be designed, constructed, and operated under an AO-approved Quality Assurance/Quality Control plan that is specific to the product transported.
E-4 Effectiveness
E-4 would reduce impacts on **subsistence-harvest patterns** by minimizing risk of pipeline leaks thus providing increased protection to terrestrial mammals, fish and fish habitat, and marine mammals. E-4 would limit the impacts that oil and gas exploration and development will have on **wild and scenic river** values. Without these stipulations, we would expect greater impacts from spills, and resulting reductions in water quality, outstandingly remarkable values for fish, wildlife, and subsistence use. E-4 would reduce the probability of oil spills thus reducing the potential for associated impacts to **vegetation**. E-4 would reduce the potential for pipeline spills or blowouts due to manufacturing, maintenance or operation failures. This would reduce the potential for direct mortality of **terrestrial mammals** due to toxic exposure and the contamination of prey and forage. There would be fewer spills, resulting in less cleanup activity along pipelines and fewer disturbance impacts to terrestrial mammals.
E-5 Required Operating Procedure
Objective: Minimize impacts of the development footprint. **Requirement/Standard:** Facilities shall be designed and located to minimize development footprint to the maximum extent practicable considering environmental, economic, and social impacts. Note: Where aircraft traffic is an issue, consideration shall be given to balancing gravel pad size and available supply storage capacity with potential reductions in the use of aircraft to support oil and gas operations.
E-4 Effectiveness
E-5 could minimize **bird** habitat burial and disturbance by requiring minimal facility footprint and reduction in air traffic. E-5 would be effective in minimizing effects on **soils** by minimizing the development footprint. E-5 would be effective in minimizing effects on **vegetation** by minimizing the development footprint. E-5 would minimize impacts of the development footprint so as to reduce environmental and **sociocultural** impacts. It will also reduce impacts to **subsistence-harvest patterns**. E-5 would reduce impacts to **endangered and threatened species** by requiring minimal facility footprint which would minimize eider habitat burial and disturbance. E-5 would require the lessee to minimize the development footprint and would be beneficial to **terrestrial wildlife** in that it would reduce the amount of habitat lost and decrease disruption of caribou movements. Conversely, it would also reduce the amount of gravel habitats created that can be used to advantage by ground squirrels. Although caribou may also use gravel pads for insect-relief habitat, the negative effects of development outweigh any positive impacts. Overall, the effect of this ROP would be beneficial to most terrestrial wildlife.
E-6 Required Operating Procedure
Objective: To reduce the potential for ice-jam flooding, erosion, and restriction of fish passage.

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Requirement/Standard: Water crossings shall be designed and constructed to ensure free passage of fish, maintain natural drainage, and minimal adverse effects to natural stream flow. Note: Bridges, rather than culverts, are the preferred method for crossing rivers. When necessary, culverts can be constructed on smaller streams, if they are large enough to avoid restricting fish passage or adversely affecting natural stream flow.

E-6 Effectiveness

E-6 would reduce impacts on **subsistence-harvest patterns** by reducing the risk of restricting passage of fish.
E-6 would limit the impacts that oil and gas exploration and development will have on **wild and scenic river** values. Without this ROP we expect greater impacts due to the obstruction to fish passage and declines in outstandingly remarkable values for fish, and subsistence use.
E-6 could be effective in minimizing effects on **soils** by maintaining natural drainages that may reduce erosion.
E-6 would protect **water resources and water quality** by requiring that water crossings be designed and constructed to maintain natural drainage and to have minimal adverse effects to natural stream flow.
E-6 would be beneficial to **freshwater fish** habitat and fish by requiring that water crossings be designed and constructed to ensure free passage of fish and to maintain natural drainage and to have minimal adverse effects to natural stream flow.

E-7 Required Operating Procedure

Objective: To minimize disruption of caribou movement and subsistence use.
Requirement/Standard: Pipelines and roads shall be designed to allow the free movement of caribou and the safe, unimpeded passage of the public while participating in traditional subsistence activities. Listed below are the currently accepted design practices:
a) Above ground pipelines shall be elevated an average of at least 7 ft as measured from the ground to the bottom of the pipeline (except where pipelines intersect a road, pad, in transition zones between buried and elevated pipelines or at ramps installed to facilitate wildlife passage and subsistence passage and access).
b) In areas where facilities or terrain may funnel caribou movement, ramps over pipelines, buried pipelines, or pipelines buried under roads may be required by the AO after consultation with Federal, State and North Slope Borough regulatory and resource agencies (as appropriate-based on agency legal authority and jurisdictional responsibility).
c) A minimum distance of 500 ft between pipelines and roads should be maintained when feasible. Separating roads from pipelines may not be feasible within narrow land corridors between lakes and where pipelines and roads converge on a drill pad.

E-7 Effectiveness

E-7 could increase the potential for **bird** collisions with pipelines by requiring that aboveground pipelines be elevated to 7 feet above the surface.
E-7 reduces **sociocultural** impacts and disruption of **subsistence-harvest patterns** by minimizing the disruption of caribou movement by requiring pipelines and roads to be designed to allow the free movement of caribou and the safe and unimpeded passage of subsistence hunters.
E-7 could increase impacts to **endangered and threatened species** by increasing the potential for eider collisions with pipelines by requiring that above ground pipelines be elevated at least 7 feet above the surface.
E-7 would greatly reduce impacts of oil development on caribou and other large **terrestrial mammals by** requiring design of roads and pipelines to allow for free movement of caribou. Pipeline height of 7 ft, and separation of roads and pipelines by 500 ft would facilitate movement of TLH caribou from insect-relief habitat to inland foraging habitat. This ROP would reduce but not eliminate impacts of oil development on caribou movements. Since caribou are sensitive to humans on foot and moving vehicles, there would be some negative effects on their ability to freely move through the

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)
area regardless of how well the facilities were designed.
E-8 Required Operating Procedure
Objective: To minimize the impact of mineral materials mining activities on air, land, water, fish, and wildlife resources. **Requirement/Standard:** Gravel mine site design and reclamation will be in accordance with a plan approved by the AO. The plan shall consider: a) Locations outside the active flood plain. b) Design and construction of gravel mine sites within active flood plains to serve as water reservoirs for future use. c) Potential use of site for enhancing fish and wildlife habitat.
E-8 Effectiveness
E-8 would reduce impacts on **subsistence-harvest patterns** by reducing the impact of gravel mining operations on birds, fish and fish habitat. E-8 would be effective in minimizing effects on **soils** through the design and reclamation of mine sites that reduce erosion and maintain natural drainages. E-8 would limit the impacts that oil and gas exploration and development will have on **wild and scenic river** values. Without this ROP we would expect greater reductions in water quality declines in outstandingly remarkable values for fish, wildlife, and subsistence use. E-8 would protect **water resources and water quality** by limiting gravel mine site design and construction impacts. E-8 could increase the probability that altered **vegetation** would eventually be returned to a natural (or at least more productive) state. E-8 would be beneficial to **freshwater fish** habitat and fish.
E-9 Required Operating Procedure
Objective: To prevent human-caused increases in populations of predators of ground nesting birds. **Requirement/Standard:** Lessee shall utilize best available technology to prevent facilities from providing nesting, denning, or shelter sites for ravens, raptors, and foxes. The lessee shall provide the AO with an annual report on the use of oil and gas facilities by ravens, raptors and foxes as nesting, denning, and shelter sites.
E-9 Effectiveness
E-9 could benefit some **birds** through avoiding artificial enhancement of bird predators by requiring use of best available technology to prevent facilities from providing nesting, denning, or shelter sites for predators. E-9 would provide increased protection for **subsistence-harvest patterns** by providing protective measures for birds. E-9 could reduce impacts to **endangered and threatened species** by avoiding artificial enhancement of eider predators by requiring use of best available technology to prevent facilities from providing nesting, denning, or shelter sites for predators.
E-10 Required Operating Procedure
Objective: To prevent migrating waterfowl, including species listed under the Endangered Species Act, from striking oil and gas and related facilities during low light conditions. **Requirement/Standard:** Except for safety lighting, illumination of higher structures shall be designed to direct artificial exterior lighting inward and

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

downward, rather than upward and outward. All drilling structures, production facilities, and other structures that exceed 20 ft shall be illuminated as outlined above.

E-10 Effectiveness

E-10 could reduce collisions of **birds** with oil and gas facilities during low light by requiring that exterior lights be directed inward and downward.
E-10 would reduce impacts on **subsistence-harvest patterns** by providing protective measures for birds.
E-10 could reduce impacts to **endangered and threatened species** by reducing collisions of eiders with oil and gas facilities during low light conditions by requiring that exterior lights be directed inward and downward.

E-11 Required Operating Procedure

Objective: To minimize the take of species listed under the Endangered Species Act and minimize the disturbance of other species of interest from direct or indirect interaction with oil and gas facilities.
Requirement/Standard: In accordance with the guidance below, before the approval of facility construction, aerial surveys of breeding pairs of the following species shall be conducted within any area proposed for development.
Spectacled and/or Steller's Eiders
a) Surveys shall be conducted by the lessee for at least three (3) years before authorization of construction, if such construction is within the FWS North Slope Eider survey area (Map 62), and at least one (1) year outside that area. Results of aerial surveys and habitat mapping may require additional ground nest surveys. Spectacled and/or Steller's eider surveys shall be conducted following accepted BLM-protocol during the second week of June.
b) If spectacled and/or Steller's eiders are determined to be present within the proposed development area, the applicant shall consult with the FWS and BLM in the design and placement of roads and facilities in order to minimize impacts to nesting and brood-rearing eiders and their preferred habitats. Such consultation shall address timing restrictions and other temporary mitigating measures, construction of permanent facilities, placement of fill, alteration of eider habitat, aircraft operations, and introduction of high noise levels.
c) To reduce the possibility of spectacled and/or Steller’s eiders from striking above ground utility lines (power and communication), such lines shall either be buried in access roads, or suspended on vertical support members, to the extend practical. Support wires associated with communication towers, radio antennas, and other similar facilities, shall be clearly marked along their entire length to improved visibility for low flying birds. Such markings shall be jointly developed through consultation with FWS.

E-11 Required Operating Procedure (continued)

Yellow-billed Loon
a) Aerial surveys shall be conducted by the lessee for at least 3 years before authorization of construction of facilities proposed for development which are within 1 mi of a lake 25 acres or larger in size. These surveys along shorelines of large lakes shall be conducted following accepted BLM protocol during nesting in late June and during brood rearing in late August.
b) Should yellow-billed loons be present, the design and location of facilities must be such that disturbance is minimized. Current accepted mitigation is a one-mile buffer around all recorded nest sites and a minimum 500-m buffer around the remainder of the lake shoreline. Development may be prohibited within buffers or activities curtailed while birds are present.

E-11 Effectiveness

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative continued)
E-11 would reduce impacts on **subsistence-harvest patterns** by providing protective measures for birds. E-11 could reduce impacts to **endangered and threatened species** by minimizing the take of ESA-listed eiders by requiring aerial surveys of breeding pairs in areas proposed for development, and through consultation with FWS and BLM concerning the design of structures before approval of any construction if listed eiders are present in such areas.
E-12 Required Operating Procedure
Objective: To ensure use of ecological mapping as a tool to assess wildlife habitat before development of permanent facilities, to conserve important habitat types during development. **Requirement/Standard:** An ecological land classification map of the development area shall be developed before approval of facility construction. The map will integrate geomorphology, surface-form and vegetation at a scale, level of resolution, and level of positional accuracy adequate for detailed analysis of development alternatives. The map shall be prepared in time to plan one season of ground-based wildlife surveys, if deemed necessary by the AO, before approval of exact facility location and facility construction.
E-12 Effectiveness
E-12 could help conserve important habitat types by requiring development of an ecological land classification map for use in siting permanent facilities. This would increase protection for **subsistence-harvest patterns** and would reduce **sociocultural** impacts by conserving important habitat types during development. E-12 requiring an assessment of wildlife habitat prior to development of permanent facilities would facilitate site-specific mitigation of impacts to **terrestrial mammals** and should reduce the overall impact of development. E-12 could mitigate impacts to **birds** by requiring development of an ecological land classification map for use in siting facilities. E-12 could conserve habitat important to **endangered and threatened species** by requiring development of an ecological land classification map for use in siting facilities.
F. Use of Aircraft for Permitted Activities
F-1 Required Operating Procedure
Objective: To minimize the effects of low-flying aircraft on wildlife, traditional subsistence activities and local communities. **Requirement/Standard:** The lessee shall ensure that aircraft used for permitted activities maintain altitudes according to the following guidelines. a) Aircraft shall maintain an altitude of at least 1,500 ft above ground level (AGL) when within ½ mi of cliffs identified as raptor nesting sites from April 15 through August 15 and within ½ mi of known gyrfalcon nest sites from March 15 to August 15, unless doing so would endanger human life or violate safe flying practices. Permittees shall obtain information from BLM necessary to plan flight routes when routes may go near falcon nests. b) Aircraft shall maintain an altitude of at least 1,000 ft AGL (except for takeoffs and landings) over caribou winter ranges from December 1 through May 1, unless doing so would endanger human life or violate safe flying practices. Caribou wintering areas will be defined annually by the AO. c) The number of takeoffs and landings to support oil and gas operations with necessary materials and supplies should be limited to the maximum extent possible. During the design of proposed oil and gas facilities, larger landing strips and storage areas should be considered so as to allow larger aircraft to be employed resulting in a fewer number of flights to the facility. d) Use of aircraft, especially rotary wing aircraft, near known subsistence camps and cabins or during sensitive subsistence hunting periods (spring goose hunting and fall caribou and moose hunting) should be kept to a minimum. e) Aircraft used for permitted activities shall maintain an altitude of at least 2,000 ft AGL (except for takeoffs and landings) over the Caribou Study

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Area (Map 91) from June 15 through July 31, unless doing so would endanger human life or violate safe flying practices.
f) Aircraft shall maintain an altitude of at least 2,000 ft AGL (except for takeoffs and landings) over the Caribou Coastal Insect-Relief Areas (Map 91) from June 15 through July 31, unless doing so would endanger human life or violate safe flying practices.

F-1 Effectiveness

F-1 could mitigate aircraft disturbance of **birds** by requiring that aircraft maintain an altitude of at least 1,500 ft AGL when within 1/2 mi of raptor nesting sites from April 15-August 15 or gyrfalcon nest sites from March 15-August 15, 2,000 ft AGL over the Caribou Study Area June 15-July31, and 2,000 ft AGL over the caribou coastal insect-relief areas June 15-July 31, and minimize the number of takeoffs and landings at all airstrips.
F-1 would benefit the **wilderness resources** and users of the area by reducing disturbance from noise.
F-1 would minimize the effects of low-flying aircraft on caribou, moose, bird populations and other wildlife and sensitive habitat areas, local communities, and traditional subsistence activities, especially during sensitive subsistence hunting periods (spring goose hunting and fall moose hunting. This would reduce impacts on **subsistence harvest patterns** and would reduce **sociocultural** impacts.
F-1 could reduce impacts to **endangered and threatened species** by reducing aircraft disturbance of eiders nesting in the vicinity of raptor nest sites, Caribou Study Areas or Insect Relief Areas, and airstrips by requiring that aircraft maintain an altitude of at least 1,500 ft AGL when within 1/2 mi of raptor nesting sites April 15-August 5 or gyrfalcon nest sites March 15-April 15, 2,000 ft AGL over the Caribou Study Area June 15-July31, and 2,000 ft AGL over the Caribou Coastal Insect Relief Areas June 15-July 31, and minimize the number of takeoffs and landings at all airstrips.
F-1 would minimize disturbance of **terrestrial mammals**, specifically caribou**,** by requiring minimum altitudes of 1,000 to 2,000 ft above ground level (AGL) for aircraft over occupied caribou winter range and caribou insect-relief areas, respectively, during critical times of the year.

G. Oil Field Abandonment

G-1 Lease Stipulation

Objective: To ensure the final disposition of the land meets the current and future needs of the public.
Requirement/Standard: Upon abandonment or expiration of the lease, all oil and gas related facilities shall be removed and sites rehabilitated to as near the original condition as practicable, subject to the review of the AO. The AO may determine that it is in the best interest of the public to retain some or all facilities.

G-1 Effectiveness

G-1 could influence the level of effects on **estuarine water quality** by requiring the removal of all oil and gas facilities upon abandonment of the operations; this would require the removal of, for example, offshore gravel islands. Gravel islands specifically would not have long-term effects, as described in Section 5. In contrast, long docks and causeways with inadequate breeches would probably have measurable, long-term impacts on hydrologic conditions, as concluded in Section 5. The removal of docks might be complicated by their connection to a road system and by their possible future use for non-oil activities. For example, West Dock has been used by subsistence hunters and could be used for general public shipping. So, there might be public objections to the removal of some facilities, moderating the stipulation's beneficial effects on water quality. In summary, the Stipulation G-1 would probably moderate the effects of exploration facilities and long causeways on estuarine water quality, but would not eliminate the effects.
G-1 would protect **water resources and water quality** by requiring removal and reclamation of developed sites upon field abandonment, which would eventually result in restoration of the natural drainage.
G-1 may increase the probability that altered **vegetation** would eventually be returned to a natural (or at least more productive) state.

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

H. Subsistence Consultation for Permitted Activities

"Consultation" may take place by in-person meetings, teleconference, videoconference, and exchange of written documents, e-mail, or other means appropriate to the circumstances. Consultation does not include public meetings that are primarily for the purpose of information distribution, unless it is explained at the beginning of the meeting that there is an open dialogue, and that comments, concerns, or other information are being actively solicited.

H-1 Required Operating Procedure

Objective: To provide opportunities for participation in planning and decision-making to prevent unreasonable conflicts between subsistence uses and oil and gas and related activities.

Requirement/Standard: Lessee/permittee shall consult directly with affected communities using the following guidelines.

a) Before submitting an application to the BLM, the applicant shall consult with directly affected subsistence communities, the North Slope Borough, and the NPR-A Subsistence Advisory Panel to discuss the siting, timing and methods of proposed operations. Through this consultation, the applicant shall make every reasonable effort, including such mechanisms as conflict avoidance agreements and mitigating measures, to ensure that proposed activities will not result in unreasonable interference with subsistence activities.

b) The applicant shall submit documentation of consultation efforts as part of its operations plan. Applicants should submit the proposed plan of operations to provide an adequate time for review and comment by the NPR-A Subsistence Advisory Panel and to allow time for formal government-to-government consultation with Native Tribal Governments. The applicant shall submit documentation of its consultation efforts and a written plan that shows how its activities, in combination with other activities in the area, will be scheduled and located to prevent unreasonable conflicts with subsistence activities. Operations plans must include a discussion of the potential effects of the proposed operation, and the proposed operation in combination with other existing or reasonably foreseeable operations.

c) A subsistence plan addressing the following items must be submitted.

1. A detailed description of the activity(ies) to take place (including the use of aircraft).
2. A description of how the lessee/permittee will minimize and/or deal with any potential impacts identified by the AO during the consultation process.
3. A detailed description of the monitoring effort to take place, including process, procedures, personnel involved and points of contact both at the work site and in the local community.
4. Communication elements to provide information on how the applicant will keep potentially affected individuals and communities up-to-date on the progress of the activities and locations of possible, short-term conflicts (if any) with subsistence activities. Communication methods could include holding community meetings, open house meetings, workshops, newsletters, radio and television announcements, etc.
5. Procedures necessary to facilitate access by subsistence users to conduct their activities.
6. In the event that no agreement is reached between the parties, the AO shall consult with the directly involved parties and determine which activities will occur, including the timeframes.
7. During development, monitoring plans must be established for new permanent facilities, including pipelines, to assess an appropriate range of potential effects on resources and subsistence as determined on a case-by-case basis given the nature and location of the facilities. The scope, intensity, and duration of such plans will be established in consultation with the AO and Subsistence Advisory Panel.

H-1 Effectiveness

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

H-1 would prevent unreasonable conflicts between subsistence uses and oil and gas and related activities. This would reduce impacts on **subsistence-harvest patterns** and would reduce impacts to **sociocultural systems** as well as address potential **environmental justice** concerns by providing opportunities for local participation in planning and decision-making.
H-1 would limit the impacts that oil and gas exploration and development will have on **wild and scenic river** values. Without this ROP, we would expect greater declines in outstandingly remarkable values for fish, wildlife, and subsistence use.

H-2 Required Operating Procedure

Objective: To prevent unreasonable conflicts between subsistence activities and geophysical (seismic) exploration.
Requirement/Standard: In addition to the consultation process described above for permitted activities, before applying for permits to conduct geophysical (seismic) exploration, the applicant shall consult with local communities and residents:
a) Because of the large land area covered by typical geophysical operations and the potential to impact a large number of subsistence users during the exploration season, the permittee/operator will notify in writing all potentially effected long-term cabin and camp users.
b) The official recognized list of cabin and campsite users is the North Slope Borough's 2001 (or most current) inventory of cabins and campsites.
c) For the purpose of this standard, potentially affected cabins and camp sites are defined as any camp or campsite within the boundary of the area subject to proposed geophysical exploration and/or within 1,200 ft of actual or planned travel routes used to supply the seismic operations while it is in operation.
d) A copy of the notification letter and a list of potentially affected users shall also be provided to the office of the appropriate Native Tribal Government.
e) Based on that consultation, the AO may prohibit seismic work up to 1,200 ft of any known, long-term, cabin or campsite. Generally, the AO will allow wintertime seismic work to be conducted within 300 ft of a long-term cabin or campsite that is not in use.

H-2 Effectiveness

H-2 would prevent unreasonable conflicts between subsistence activities and geophysical (seismic) exploration. This ROP would reduce impacts on **subsistence harvest patterns** and would reduce impacts to **sociocultural** systems as well as address potential **environmental justice** concerns by providing opportunities for local participation in planning and decision-making.
H-2 would limit the impacts that oil gas exploration and development will have on **wild and scenic river** values. Without this ROP we would expect greater declines in outstandingly remarkable values for fish, wildlife, and subsistence use.

I. Orientation Programs Associated with Permitted Activities

I-1 Required Operating Procedure

Objective: To minimize cultural and resource conflicts.
Requirement/Standard: All personnel involved in oil and gas and related activities shall be provided information concerning applicable stipulations, required operating procedures, standards, and specific types of environmental, social, traditional, and cultural concerns that relate to the region. The lessee/permittee shall ensure that all personnel involved in permitted activities shall attend an orientation program at least once a year. The proposed orientation program shall be submitted to the AO for review and approval and should:
a) Provide sufficient detail to notify personnel of applicable stipulations and required operating procedures as well as inform individuals working on the project of specific types of environmental, social, traditional and cultural concerns that relate to the region.
b) Address the importance of not disturbing archaeological and biological resources and habitats, including endangered species, fisheries, bird

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

colonies, and marine mammals, and provide guidance on how to avoid disturbance.
c) Include guidance on the preparation, production, and distribution of information cards on endangered and/or threatened species.
d) Be designed to increase sensitivity and understanding of personnel to community values, customs, and lifestyles in areas in which personnel will be operating.
e) Include information concerning avoidance of conflicts with subsistence, commercial fishing activities, and pertinent mitigation.
f) Include information for aircraft personnel concerning subsistence activities and areas/seasons that are particularly sensitive to disturbance by low flying aircraft. Of special concern is aircraft use near traditional subsistence cabins and campsites, flights during spring goose hunting and fall caribou and moose hunting seasons, and flights near North Slope communities.
g) Provide that individual training is transferable from one facility to another except for elements of the training specific to a particular site.
h) Include on-site records of all personnel who attend the program for so long as the site is active, though not to exceed the 5 most recent years of operations. This record shall include the name and dates(s) of attendance of each attendee.
i) Include a module discussing bear interaction plans to minimize conflicts between bears and humans.

I-1 Effectiveness

I-1 could help reduce disturbance of **birds** by providing all personnel with information concerning applicable required operating procedures and stipulations, and the importance of not disturbing biological resources, habitats, and bird colonies.
I-1 would reduce impacts on **subsistence-use patterns** and would reduce **cultural** conflicts as well as address potential **environmental justice** concerns by providing a cultural orientation program for all oil and gas workers involved in NPR-A activities in order to minimize cultural and resource conflicts with local inhabitants.
I-1 would reduce the impacts that oil and gas exploration and development will have on **wild and scenic river** values. Without this ROP we would expect greater impacts on fish, birds, terrestrial mammals and declines in outstandingly remarkable values for fish, wildlife, and subsistence use.
I-1 would reduce the acreage of impacts to **vegetation** by mking personnel involved in oil- and gas-related activities more aware of applicable stipulations and ROP's and their purpose.
I-1 could reduce impacts to **endangered and threatened species** through helping to reduce disturbance of eiders by providing all personnel with information concerning applicable required operating procedures and stipulations, and importance of not disturbing biological resources, habitats, and bird colonies.
I-1 would reduce impacts on **terrestrial mammals** by making workers more aware of the potential impacts of their activities on wildlife. Education of employees should reduce the potential for harassment and direct mortality of terrestrial mammals. This ROP would reduce the likelihood of "defense of life and property" killing of bears.

K. Area-Specific Lease Stipulations and Required Operating Procedures

K-1 Lease Stipulation - Rivers

Objective: To minimize the disruption of natural flow patterns and changes to water quality; the disruption of natural functions resulting from the loss or change to vegetative and physical characteristics of floodplain and riparian areas; the loss of spawning, rearing or over wintering habitat for fish; the loss of cultural and paleontological resources; the loss of raptor habitat; impacts to subsistence cabin and campsites; the disruption of subsistence activities; and impacts to scenic and other resource values. (See ROP D-1 for restrictions on exploration activities.)
Requirement/ Standard: Permanent oil and gas facilities, including gravel pads, roads, airstrips, and pipelines, are prohibited in the stream bed

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

and adjacent to the rivers listed below at the distances identified. These setbacks are measured from the centerline of the river as determined by the current hydrology at the time of application. The standard setback is ½ mi and increased to ¾ mi where subsistence cabin and campsites are numerous. Along the Colville River and a portion of the Ikpikpuk a 1-mi setback is required to protect important raptor habitat. (For locations along rivers where setback distances change, see Map 20.) On a case-by case basis, and in consultation with Federal, State, and North Slope Borough regulatory and resource agencies (as appropriate - based on agency legal authority and jurisdictional responsibility), essential pipeline and road crossings perpendicular to the main channel will be permitted (unless noted otherwise) through setback areas. The above setbacks may not be practical within river deltas. In these situations, permanent facilities shall be designed to withstand a 200-year flood event.

a) Colville River: a 1-mi setback from the northern bluff (or bank if there is no bluff) of the Colville River extending the length of that portion of the river within the Planning Area. Road crossings intended to solely support oil and gas activities are prohibited. Note: This provision does not apply to intercommunity or other permanent roads constructed with public funds for general transportation purposes. This preserves the opportunity to plan, design, and construct public transportation systems to meet the economic, transportation, and public health and safety needs of the State of Alaska and/or communities within NPR-A.

b) Ikpikpuk River: a ¾-mi setback from the centerline of the Ikpikpuk River extending from the mouth south to Sec. 19, T7N, R11W, UM. From Sec. 19, T7N, R11W, UM to Sec. 4 T3N, R12W, UM, a 1-mile setback is required. Beginning at Sec. 4 T3N, R12W, UM, a ½-mi setback will be required to the confluence of the Kigalik River and Maybe Creek. NOTE: setback distances only apply to the west bank where the Ikpikpuk River is the Planning Area boundary.

c) Alaktak River: a ¾-mi setback from the centerline of the Alaktak River extending from the mouth to the Ikpikpuk River.

d) Chipp River: a ¾-mi setback from the centerline of the Chipp River extending from the mouth to the Ikpikpuk River.

e) Oumalik River: a ¾-mi setback from the centerline of the Oumalik River from the mouth upstream to Sec. 5, T8N, R14W, UM, and a ½-mi setback from Sec. 5, T8N, R14W, UM, upstream to Sec. 2, T5N, R15W, UM.

f) Titaluk River: a ½-mi setback from the centerline of the Titaluk River from the confluence with the Ikpikpuk River upstream to Sec. 1, T2N, R22W, UM.

g) Kigalik River: a ½-mi setback from the centerline of the Kigalik River from the confluence with the Ikpikpuk River upstream to the Planning Area boundary.

h) Maybe Creek: a ½-mi setback from the centerline of the Maybe Creek from the confluence with the Ikpikpuk River upstream to Sec. 8, T2S R6W, UM.

i) Topagoruk River: a ¾-mi setback from the centerline of the Topagoruk River from the mouth upstream to the confluence with Ishuktak Creek. A ½-mi setback from each bank upstream from the confluence with the Ishuktak to Sec. 3, T7N, R17W, UM.

j) Ishuktak Creek: a ½-mi setback from the centerline of Ishuktak Creek from the confluence with the Topagoruk River to Sec. 24, T8N, R16W, UM.

k) Meade River: a ¾-mi setback from the centerline of the Meade River upstream to Sec. 6, T6N, R21W, UM. A 1/2-mile setback from each bank upstream from Sec. 6, T6N, R21W, UM to the Planning Area boundary.

l) Usuktuk River: a ¾-mi setback from the centerline of the Usuktuk River upstream from the confluence with the Meade River to Sec. 36, T10N, R19W, UM.

m) Pikroka Creek a ¾-mi setback from the centerline of the Pikroka Creek upstream from the confluence with the Meade River to Sec. 11, T8N, R23W, UM.

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)
K-1 Lease Stipulation - Rivers (continued)
n) Nigisakturik River: a ¾-mi setback from the centerline of the Nigisakturik River upstream from the confluence with the Meade River to Sec. 1, T11N, R25W, UM. o) Inaru River: a ¾-mi setback from the centerline of the Inaru River from the mouth upstream to Sec. 17, T15N, R25W, UM. p) Kucheak Creek: a ¾-mi setback from the centerline of Kucheak Creek from the confluence with the Inaru River upstream to Sec. 20, T13N, R24W, UM. q) Avalik River: a ½-mi setback from the centerline of the Avalik River along that portion of the river within the Planning Area.
K-1 Effectiveness
K-1 could mitigate disturbance of raptors nesting along listed waterways and other **birds** occupying adjacent corridors--as well as avoiding destruction of habitats--by prohibiting permanent oil and gas facilities within established setback zones along listed waterways. K-1 would reduce impacts on **subsistence-harvest patterns** by specifically identifying the rivers of prime importance to subsistence and defining setback requirements. These setbacks protect against impeding subsistence pursuits, guard against potential **sociocultural** disruptions that then fall under the purview of **environmental justice**. K-1 would protect aquatic, floodplain and riparian areas adjacent to rivers and although it might not reduce the total acreage of **vegetation** impacted by an action, it might shift the impacts from more valuable wetland or riparian vegetation types to habitats perceived as lesser in value. K-1 could reduce the small potential for impacts to **paleontological and cultural resources** from spill cleanup by establishing setbacks along the major rivers and streams. K-1 could reduce impacts to **endangered and threatened species** by helping to reduce disturbance of eiders nesting or occupying areas along identified waterways, as well as by avoiding destruction of habitats by prohibiting permanent oil and gas facilities within the listed setback areas. K-1 would be beneficial to both **freshwater and marine fish and fish habitat** by reducing the potential for accidental spills to enter riverine waters which in turn could contaminate coastal/marine waters where marine fishes might be impacted. The setbacks also would increase the opportunity for oil spill response and cleanup to occur well before contaminants enter either riverine or coastal/marine fish habitats.
K-2 Lease Stipulation - Deep Water Lakes
Objective: To minimize the disruption of natural flow patterns and changes to water quality; the disruption of natural functions resulting from the loss or change to vegetative and physical characteristics of deep water lakes; the loss of spawning, rearing or over wintering habitat for fish; the loss of cultural and paleontological resources; impacts to subsistence cabin and campsites; and the disruption of subsistence activities. **Requirement/ Standard:** Permanent oil and gas facilities, including gravel pads, roads, airstrips, and pipelines, are prohibited on the lake or lakebed and within ¼ mi of the ordinary high water mark of any deep lake as determined to be in lake zone III, i.e., depth > 4m (Mellor, 1985). On a case-by case basis, and in consultation with Federal, State and North Slope Borough regulatory and resource agencies (as appropriate based on agency legal authority and jurisdictional responsibility), essential pipeline, road crossings and other permanent facilities may be permitted through or in these areas where the lessee can demonstrate on a site-specific basis that impacts would be minimal or it is determined that there is no feasible or prudent alternative.
K-2 Effectiveness
K-2 could reduce impacts to some **birds** by minimizing the loss of habitat of fish prey of fish-eating birds (e.g., loons, mergansers, terns), which could adversely affect the breeding success of these water bird species.

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

K-2 Effectiveness (continued)

K-2 would provide increased protection to **subsistence-use patterns** by protecting fish and fish habitat.
K-2 would protect **water resources and water quality** by protecting aquatic and riparian areas adjacent to deep-water lakes.
K-2 could reduce impacts to **endangered and threatened species** by minimizing the loss of eider habitats, which could adversely affect their breeding success.
K-2 would be beneficial to **freshwater fish habitat and fish** by reducing the potential for accidental spills into deep-water lakes.

K-3 Lease Stipulation - Dease Inlet, Admiralty Bay, Elson Lagoon, and Associated Barrier Islands

Lease stipulations, for Dease Inlet, Admiralty Bay, Elson Lagoon, and the Barrier Islands, contain specific criteria that have been incorporated into stipulation language. Because of sensitive biological resources and/or subsistence concerns of Dease Inlet, Admiralty Bay, Elson Lagoon, and inland of the Barrier Islands, the standard(s) for exploration and development activities are set high with the burden of proof resting with the lessee to demonstrate to the AO that granting an approval is warranted.
Objective: Protect fish and wildlife habitat, preserve air and water quality, and minimize impacts to traditional subsistence activities and historic travel routes on Dease Inlet, Admiralty Bay, and Elson Lagoon.
Requirement/Standard (Exploration): Oil and gas exploration operations (e.g., drilling, seismic exploration, and testing) are not allowed on Dease Inlet, Admiralty Bay, and Elson Lagoon (including natural and barrier islands), between May 15 and October 15 of each season. Requests for approval of any activities must be submitted in advance and must be accompanied by evidence and documentation that demonstrates to the satisfaction of the Authorized Office that the actions or activities meets all of the following criteria:
a) Exploration activities will not unreasonably conflict with traditional subsistence uses or significantly impact seasonally concentrated fish and wildlife resources.
b) There is adequate spill response capability to effectively respond during periods of broken ice and/or open water, or, the availability of alternative methods to prevent well blowouts during periods when adequate response capability cannot be demonstrated. Such alternative methods may include improvements in blowout prevention technology, equipment and/or changes in operational procedures, and "top-setting" of hydrocarbon-bearing zones.
c) Reasonable efforts will be made to avoid or minimize impacts related to oil spill response activities, including vessel, aircraft, and pedestrian traffic will be conducted to minimize additional impacts or further compounding of "direct spill" related impacts on area resources and subsistence uses.
d) The location of exploration and related activities shall be sited so as to not pose a hazard to navigation by the public using high-use traditional subsistence-related travel routes into and through Dease Inlet, Admiralty Bay and Elson Lagoon, as identified by the North Slope Borough, recognizing that marine and nearshore travel routes change over time, subject to shifting environmental conditions.
e) Before conducting open water activities, the lessee shall consult with the Alaska Eskimo Whaling Commission and the North Slope Borough to minimize impacts to the fall and spring subsistence whaling activities of the communities of the North Slope
Requirement/Standard (Development): With the exception of linear features such as pipelines, no permanent oil and gas facilities are permitted on or under the water within ¾ mi seaward of the shoreline (as measured from mean high tide) of Dease Inlet, Admiralty Bay, and Elson Lagoon or the natural islands (excluding Barrier Islands). Elsewhere, permanent facilities within Dease Inlet, Admiralty Bay, and Elson Lagoon will only be permitted on or under the water if they can meet all the following criteria:

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

f) Design and construction of facilities shall minimize impacts to traditional subsistence uses, travel corridors, seasonally concentrated fish and wildlife resources.
g) Daily operational activities, including use of support vehicles, watercraft, and aircraft traffic, alone or in combination with other past, present, and reasonably foreseeable activities, shall be conducted to minimize impacts to traditional subsistence uses, travel corridors, and seasonally concentrated fish and wildlife resources.
h) The location of oil and gas facilities, including artificial islands, platforms, associated pipelines, ice or other roads, bridges or causeways, shall be sited and constructed so as to not pose a hazard to navigation by the public using traditional high-use subsistence-related travel routes into and through Dease Inlet, Admiralty Bay and Elson Lagoon as identified by the North Slope Borough.
i) Demonstrated year-round oil spill response capability, including the capability of adequate response during periods of broken ice or open water, or the availability of alternative methods to prevent well blowouts during periods when adequate response capability cannot be demonstrated. Such alternative methods may include seasonal drilling restrictions, improvements in blowout prevention technology, equipment and/or changes in operational procedures, and "top-setting" of hydrocarbon-bearing zones.
j) Reasonable efforts will be made to avoid or minimize impacts related to oil spill response activities, including vessel, aircraft, and pedestrian traffic that add to impacts or further compound "direct spill" related impacts on area resources and subsistence uses.
k) Before conducting open water activities, the lessee shall consult with the Alaska Eskimo Whaling Commission and the North Slope Borough to minimize impacts to the fall and spring subsistence whaling activities of the communities of the North Slope.

K-3 Effectiveness

K-3 could protect **bird** habitats and avoid disturbance of seasonally concentrated birds by prohibiting oil and gas exploration activity between May 15-October 15, requiring adequate year-round spill response capability including during periods of broken ice or alternative methods to prevent oil spills, requiring that facilities minimize impacts to seasonally concentrated birds, and requiring that daily activities are conducted to minimize impacts to seasonally concentrated birds.

K-3 would be most effective in protecting **estuarine water quality** by potentially moderating the effect of exploration spills on estuarine water quality. As noted above, a 500- or 900-bbl spill during the open water season would form a slick and dissolve partially in the water column. The hydrocarbon concentration might exceed the 0.015-ppm chronic criteria for up to 30 days in an area that ranges up to 70 mi^2 (180 km^2) in size. The stipulation could potentially moderate this effect because exploration operations might be limited to the solid-ice season—a period for which spill response tactics could recover most of the oil (US DOI, MMS, 2003:Sec. IV.A.6). However, the stipulation explains also (Part. b) that the solid-ice restriction would end with, in part, demonstration of “adequate spill response capability to effectively respond during periods of broken ice and/or open water. . . .” The MMS, which has approval authority on oil spill contingency plans for offshore facilities, describes the existing response capabilities in the document above, noting that “offshore operators in the Beaufort Sea currently maintain spill response, containment, and collection equipment to respond to releases the entire year” (US DOI, MMS, 2003:Sec. IV.A.6.a). So, approval of spill-response capability during open-water and broken-ice season might occur upon initiation of NW NPR-A exploration operations. Open-water spill responses generally recover about a third of the spilled oil, leaving some in the water column, so approval of open-water responses could increase inadvertently the effects on water quality. If open-water and broken-ice spill plans are not approved, the chance of estuarine spills would not be eliminated because a few operations could be conducted anyway. For example, the stipulation would restrict operations that are permitted, but would not apply to non-permitted operations,

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

K-3 Effectiveness (continued)

including the barging of fuel which is conducted always during the open-water season with US Coast Guard-approved spill-contingency plans. In summary, the effectiveness of Stipulation K-3 is hard to assess without a more specific performance-based requirement of what would demonstrate "adequate spill response capability to effectively respond".

K-3 would reduce effects on **marine mammals** by not allowing oil and gas exploration operations on Dease Inlet, Admiralty Bay, and Elson Lagoon including natural and barrier islands, between May 15 and October 15 of each season. This measure would avoid disturbance of spotted seals and other marine mammals during the open water season. There would be a setback 3/4 mile from the shore and around natural islands (excluding the barrier islands) where no development could occur on or under the water. This setback would include Oarlock Island in Admiralty Bay an important haul-out area for spotted seals. This stipulation would minimize disturbance and habitat effects on spotted seals in the Dease Inlet-Admiralty Bay area. K-3 also addresses oil spill cleanup capability, and oil spill response activities that could help to minimize effects on marine mammals in the Dease Inlet-Admiralty Bay and Elson Lagoon areas.

K-3 would protect subsistence resources and access in Dease Inlet, Admiralty Bay, and Elson Lagoon. This protection of subsistence pursuits as set down in ANILCA (P.L. 96-487); helps to guard against potential impacts to **subsistence-harvest patterns**, **sociocultural** disruptions that then fall under the purview of **environmental justice**.

K-3 could reduce impacts to **endangered and threatened species** by protecting eider habitats and avoiding disturbance of seasonally concentrated eiders by 1) prohibiting oil and gas exploration activity between May 15-October 15, 2) requiring adequate year round spill response capability including during periods of broken ice or alternative methods to prevent oil spills (K-3 b), requiring that facilities minimize impacts to seasonally concentrated birds (K-3 f), and requiring that daily activities are conducted to minimize impacts to seasonally concentrated eiders (K-3g).

K-3 would prohibit oil and gas exploration operations on Dease Inlet, Admiralty Bay, and Elson Lagoon (including natural and barrier islands) between the periods of May 15 and October 15 of each season and requires adequate year round spill response capability including during periods of broken ice. This reduces the potential for impacts to **freshwater and marine fishes and their habitat** from oil and gas operations.

K-4 Required Operating Procedure - Brant Survey Area

Objective: To minimize the loss or alteration of habitat for, or disturbance of, nesting and brood rearing brant in the Brant Survey Area.

Requirement/Standard:

a) Aerial surveys for brant nesting colonies and brood-rearing areas shall be conducted for a minimum of 2 years before authorization of construction of permanent facilities. At a minimum, the survey area shall include the proposed development site(s) (i.e., the footprint) and the surrounding ½-mi area. These surveys shall be conducted following accepted BLM protocol.

b) Development may be prohibited or activities curtailed within ½ mi of all identified brant nesting colonies and brood-rearing areas identified during the 2-year survey.

K-4 Effectiveness

K-4 would reduce impacts to **birds** by reducing habitat loss or disturbance of nesting and brood-rearing brant by requiring pre-construction aerial surveys of proposed development sites and surrounding area, and by prohibiting development or curtailing activities within 1/2 mi of brant colonies. and brood-rearing areas.

K-4 would reduce impacts to **subsistence-harvest patterns** by protecting brant.

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)
K-5 Required Operating Procedure - Caribou Study Area
Objective: To minimize hindrance or alteration of caribou movements through insect-relief habitat. **Requirement/Standard:** Before authorization of construction of permanent facilities, the lessee shall design and implement a study of caribou movement, especially during the insect season. The study would include a minimum of 3 years of current data on caribou movements. The study design shall be approved by the AO and should provide information necessary to determine facility (including pipeline) design and location. Lessees may submit individual study proposals or they may combine with other lessees in the area to do a single, joint study for the entire Caribou Study Area. Study data may be gathered concurrently with other activities.
K-5 Effectiveness
K-5 would greatly reduce but not totally eliminate impacts to **terrestrial mammals**, specifically TLH caribou. The presence of facilities and associated human activity would still result in disturbance impacts to caribou. Caribou distribution can vary from year to year depending upon many factors. What appears to be the best design and location based on a minimum of three years of data may not hold true over the life of the facility or may be altered as additional infrastructure is constructed in other areas. K-5 would reduce impacts on **subsistence use patterns** by providing increased protection to caribou.
K-6 Lease Stipulation - Coastal Areas
Objective: To minimize hindrance or alteration of caribou movement within caribou coastal insect-relief areas; to prevent contamination of marine waters; loss of important bird habitat; alteration or disturbance of shoreline marshes; and impacts to subsistence resources activities. **Requirement/Standard:** In the Coastal Area, permanent oil and gas facilities, including gravel pads, roads, airstrips, and pipelines established to support exploration and development activities shall be located at least ¾ mi inland from the coastline to the extent practicable. Where, as a result of technological limitations, economics, logistics, or other factors, a facility must be located within ¾ mi inland of the coastline, the practicality of locating the facility at previously occupied sites such as the former Cape Simpson, Peard Bay, or Wainwright DEW-line sites shall be considered. Use of existing sites within ¾ mi of the coastline shall also be acceptable where it is demonstrated that use of such sites will reduce impacts to shorelines or otherwise be environmentally preferable. All lessees/permittees involved in activities in the immediate area must coordinate use of these new or existing sites with all other prospective users.
K-6 Effectiveness
K-6 would not reduce the acreage of **vegetation** impacted by an action, but might shift the impacts from more valuable wetland or riparian vegetation types to habitats perceived as lesser in value. K-6 would require permanent oil and gas facilities to be located 3/4 mi inland from the coastline to the extent practicable. This stipulation would thereby reduce the potential for accidental spills to enter coastal/marine waters where **marine fishes** might be impacted. They would increase the opportunity for oil spill response and cleanup well before they enter either riverine or coastal/marine fish habitats; consequently, they reduce the potential for a spill to adversely impact marine fishes. K-6 would reduce impacts on **subsistence harvest patterns** by providing increased protection to caribou, birds and marine fish and mammals. K-6 would help to prevent large fuel or crude oil spills, and consequently reduce the small potential for impacts to **paleontological and cultural** resources from spill cleanup.

Effectiveness of Lease Stipulations and Required Operating Procedures for the Preferred Alternative (continued)
K-7 Required Operating Procedure - Colville River Special Area
Objective: To prevent or minimize loss of raptor foraging habitat. **Requirement/Standard:** If necessary to construct permanent facilities within the Colville River Special Area, all reasonable and practicable efforts shall be made to locate permanent facilities as far from raptor nests as feasible. Within 15 mi of raptor nest sites, significant alteration of high quality foraging habitat shall be prohibited unless the lessee can demonstrate on a site-specific basis that impacts would be minimal or it is determined that there is no feasible or prudent alternative. Of particular concern are ponds, lakes, wetlands, and riparian habitats. Note: On a case-by case basis, and in consultation with appropriate Federal and State regulatory and resource agencies, essential pipeline and road crossings will be permitted through these areas where no other options are available.
K-7 Effectiveness
K-7 could reduce impacts on **birds**--specifically important habitats of raptors occupying surrounding areas in the Colville River Special Area--by prohibiting, within 15 miles of raptor nest sites, significant alteration of high-quality raptor foraging habitat, particularly in waterbody, wetland, and riparian habitats. K-7 would not reduce the acreage of **vegetation** impacted by an action, but might shift the impacts from more valuable wetland or riparian vegetation types to habitats perceived as lesser in value. K-7 could reduce impacts to **endangered and threatened species** by reducing impacts on important habitats of eiders occupying the Colville River Special Area by prohibiting, within 15 miles of raptor nest sites, significant alteration of high-quality raptor foraging habitat, particularly in waterbody, wetland, and riparian habitats.
K-8 Lease Stipulation - Kasegaluk Lagoon Special Area
Objective: To protect the habitat of the fish, waterfowl, and terrestrial and marine wildlife resources of Kasegaluk Lagoon. To protect traditional subsistence uses and public access to and through Kasegaluk Lagoon for current and future generations of North Slope residents. **Requirement/Standard:** Within the Kasegaluk Lagoon Special Area, oil and gas leasing is approved subject to the decision to defer the implementation of oil and gas leasing in the "Leasing Deferral Area." When leasing is implemented, no permanent oil and gas facilities are permitted within the boundary of the Special Area. Geophysical (seismic) exploration is authorized subject to the terms and conditions provided in other applicable ROP's. No restrictions are imposed on traditional subsistence activities and access for subsistence purposes.
K-8 Effectiveness
K-8 could protect **birds** using Kasegaluk Lagoon by prohibiting permanent oil and gas facilities within the boundary of the Special Area. K-8 could reduce impacts to **endangered and threatened species** by protecting eiders using Kasegaluk Lagoon by prohibiting permanent oil and gas facilities within the boundary of the Special Area. K-8 would be beneficial to **freshwater fish** and habitat by prohibiting permanent oil and gas facilities within the boundary of the Special Area.

ROP = Required Operating Procedure